

*FIG. 3*

TRAFFIC INFORMATION  
QUANTIZATION TABLE  
(SPEED QUANTIZATION TABLE)

QUANTIZED VOLUME	SPEED (km/h)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10~11
11	12~13
12	14~15
13	16~17
14	18~19
15	20~24
16	25~29
17	30~34
18	35~39
19	40~44
20	45~49
21	50~59
22	60~69
23	70~79
24	80~99
}	
30	200 OR MORE

FIG. 4

EXAMPLE OF ENCODING TABLE OF STATISTICAL PREDICTION  
DIFFERENCE VALUE OF TRAFFIC INFORMATION

SPECIAL CODE		CODE	ADDITIONAL BIT	
SECTION LENGTH CHANGE CODE		101	3 (40/80/160/.../5120m)	
TRAFFIC INFORMATION QUANTIZATION TABLE CHANGE CODE		111110	4 (TABLE NUMBER)	
IDENTIFICATION CODE FOR A POINT CORRESPONDING TO REFERENCE NODE		1100	6 (CORRESPONDING REFERENCE NODE NUMBER) + 8 (OFFSET DISTANCE FROM REFERENCE NODE)	
ENCODING TABLE FOR STATISTICAL PREDICTION DIFFERENCE VALUES OF TRAFFIC INFORMATION		CODE	ADDITIONAL BIT I	ADDITIONAL BIT II (RANGE)
RUN LENGTH	CHANGE VOLUME			
0	0	0	0	-
5	0	100	0	-
10	0	1101	0	-
0	$\pm 1$	1110	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 2$	111100	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 4$	111101	1 ( $\pm$ IDENTIFICATION)	1 (3 OR 4)
}				

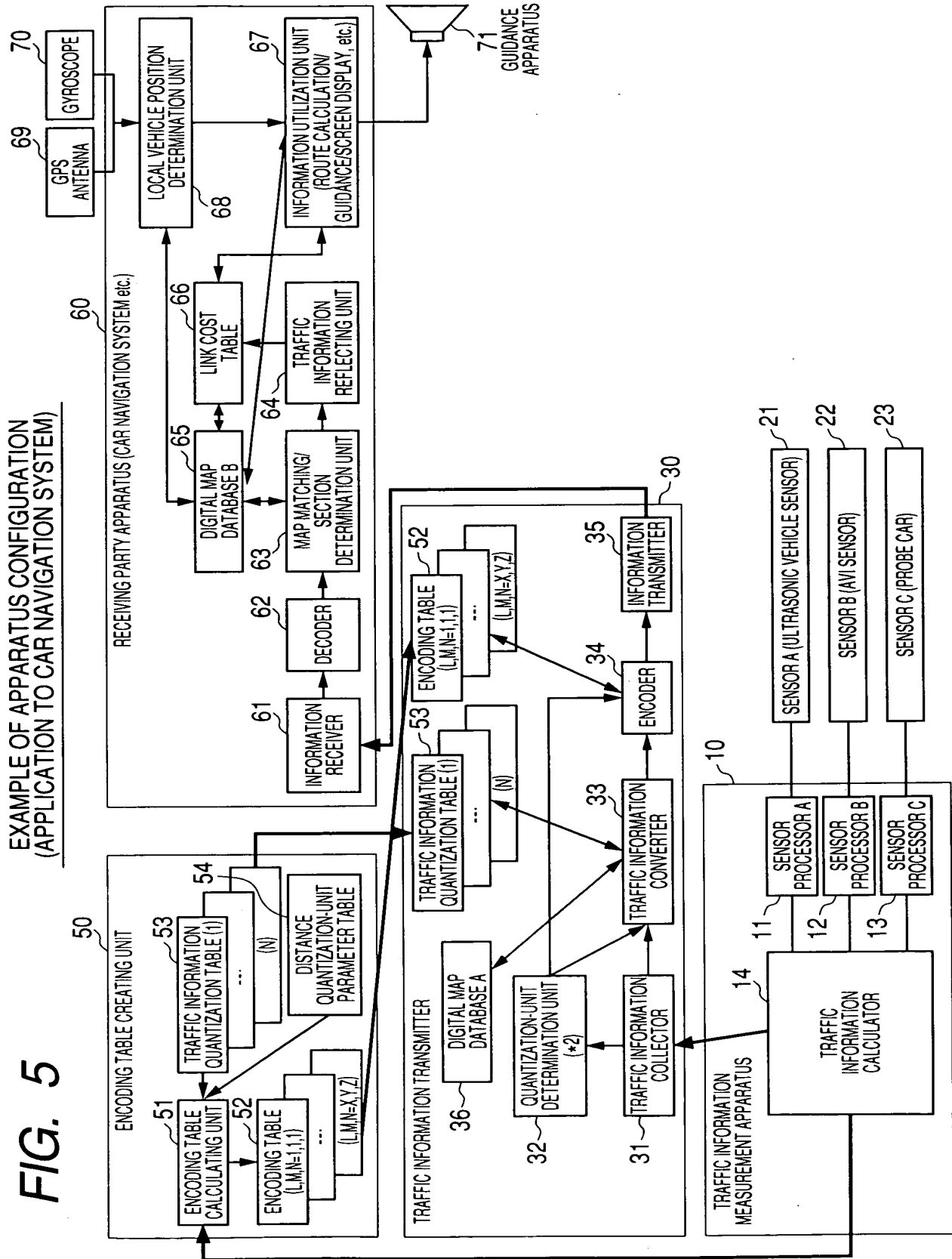


FIG. 6

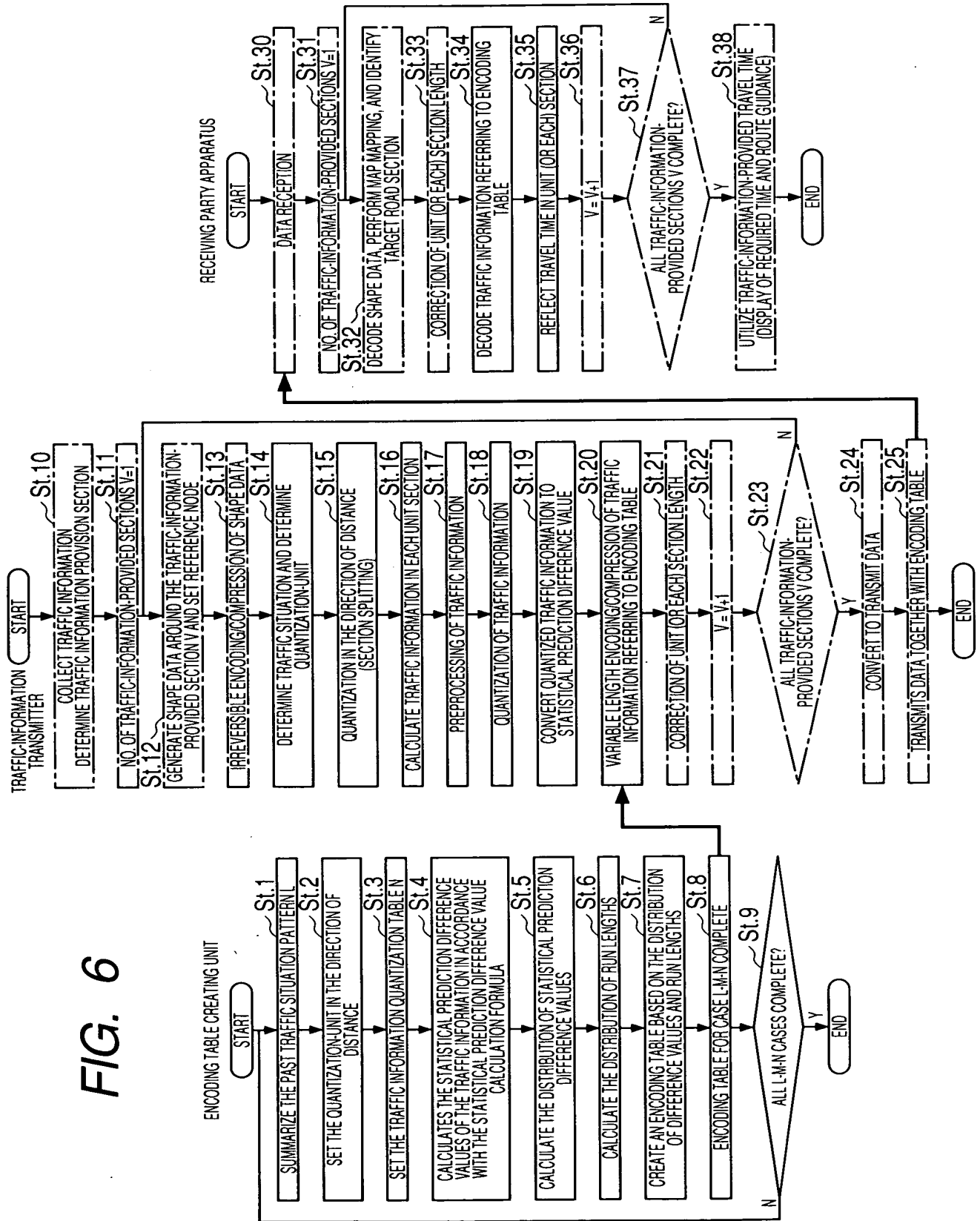


FIG. 7(a)

EXAMPLE OF MAP DATA STRUCTURE

MANAGEMENT INFORMATION (INFORMATION TYPE/BLOCK DEFINITION, ETC.)	
NO. OF NODES N	
NODE NUMBER 1	
NODE ATTRIBUTE INFORMATION OF NODE 1	
LONGITUDE OF NODE 1	LATITUDE OF NODE 1
NO. OF NODES CONNECTED TO NODE 1	
CONNECTING NODE NUMBER #1	LINK NUMBER #1-1
§	
CONNECTING NODE NUMBER #m	LINK NUMBER #1-m
§ §	
NODE NUMBER N	
NODE ATTRIBUTE INFORMATION OF NODE N	
LONGITUDE OF NODE N	LATITUDE OF NODE N
NO. OF NODES CONNECTED TO NODE N	
CONNECTING NODE NUMBER #1	LINK NUMBER #N-1
§	
CONNECTING NODE NUMBER #m	LINK NUMBER #N-m
NO. OF LINK L	
LINK NUMBER 1	
LINK ATTRIBUTE INFORMATION OF LINK 1	
NO. OF COMPONENT INTERPOLATION POINTS OF LINK 1	
LONGITUDE OF INTERPOLATION POINT 1-1	LATITUDE OF INTERPOLATION POINT 1-1
§	
LONGITUDE OF INTERPOLATION POINT 1-p	LATITUDE OF INTERPOLATION POINT 1-p
§ §	
LINK NUMBER L	
LINK ATTRIBUTE INFORMATION OF LINK L	
NO. OF COMPONENT INTERPOLATION POINTS OF LINK L	
LONGITUDE OF INTERPOLATION POINT L-1	LATITUDE OF INTERPOLATION POINT L-1
~	
LONGITUDE OF INTERPOLATION POINT L-p	LATITUDE OF INTERPOLATION POINT L-p

FIG. 7(b)

EXAMPLE OF TRAFFIC INFORMATION DATA  
(EXAMPLE OF TRAVEL TIME/SPEED)

MAP DATA LINK NUMBER 1	
CURRENT: TRAVEL TIME	CURRENT: SPEED
5 MINUTES AFTER: TRAVEL TIME	5 MINUTES AFTER: SPEED
10 MINUTES AFTER: TRAVEL TIME	10 MINUTES AFTER: SPEED
§	
Z MINUTES AFTER: TRAVEL TIME	Z MINUTES AFTER: SPEED
§ §	
MAP DATA LINK NUMBER K	
CURRENT: TRAVEL TIME	CURRENT: SPEED
5 MINUTES AFTER: TRAVEL TIME	5 MINUTES AFTER: SPEED
10 MINUTES AFTER: TRAVEL TIME	10 MINUTES AFTER: SPEED
§	
Z MINUTES AFTER: TRAVEL TIME	Z MINUTES AFTER: SPEED
§ §	

*FIG. 8(a)*SHAPE DATA STRING INFORMATION  
(CODING/COMPRESSION DATA)

HEADER INFORMATION	
NO. OF SHAPE DATA N	
SHAPE DATA IDENTIFICATION NUMBER=1	
ENCODING TABLE IDENTIFICATION CODE	
ACCURACY INFORMATION OF MAP DATA AT SHAPE SOURCE	
DIRECTION OF ONE-WAY TRAFFIC (FORWARD/BACKWARD/NONE)	
BEGINNING NODE NUMBER $ps$	
NODE $ps$ X DIRECTION ABSOLUTE COORDINATE (LONGITUDE)	
NODE $ps$ Y DIRECTION ABSOLUTE COORDINATE (LATITUDE)	
NODE $ps$ ABSOLUTE BEARING	
$ps$ POSITION ERROR (m)	$ps$ BEARING ERROR ( $^{\circ}$ )
MAXIMUM POSITION ERROR OF ENCODED SHAPE DATAT (m)	MAXIMUM BEARING ERROR OF ENCODED SHAPE DATAT ( $^{\circ}$ )
ENCODED SHAPE DATA INCLUDES THE FOLLOWING INFORMATION: <ul style="list-style-type: none"> <li>· REFERENCE NODE SETTING CODE</li> <li>· SECTION LENGTH CHANGE CODE</li> <li>· EOD CODE</li> </ul>	
END NODE NUMBER $pe$	
NODE $pe$ X DIRECTION RELATIVE COORDINATE (LONGITUDE)	
NODE $pe$ Y DIRECTION RELATIVE COORDINATE (LATITUDE)	
NODE $pe$ ABSOLUTE BEARING	
$pe$ POSITION ERROR (m)	$pe$ BEARING ERROR ( $^{\circ}$ )
§	
SHAPE DATA IDENTIFICATION NUMBER=M	
§	

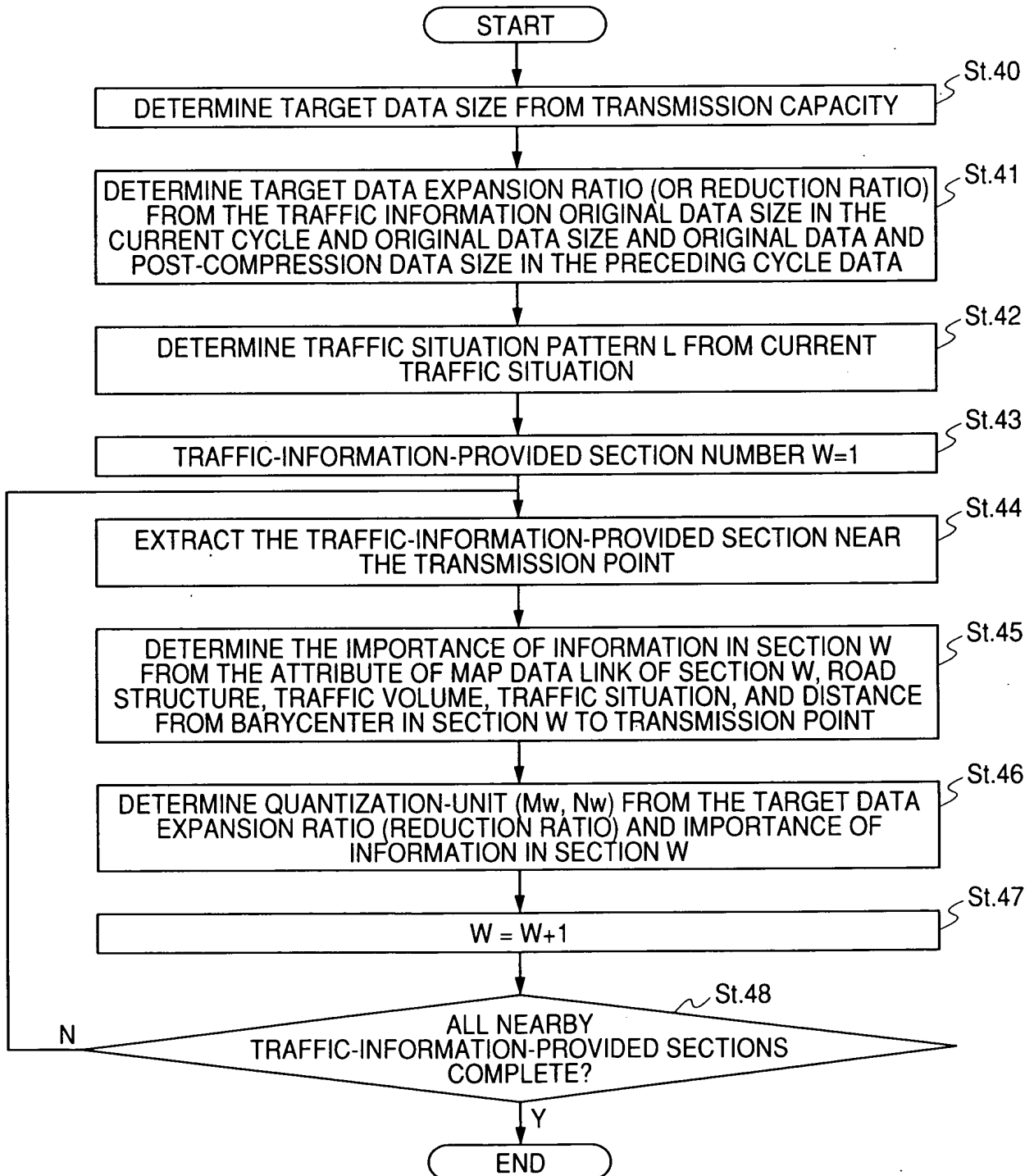
*FIG. 8(b)*

## TRAFFIC INFORMATION

HEADER INFORMATION	
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE $Pa$	END REFERENCE NODE $Pb$
DISTANCE DIRECTION QUANTIZED SECTION LENGTH IDENTIFICATION CODE	
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
ENCODING TABLE IDENTIFICATION CODE	
NO. OF QUANTIZED UNIT SECTIONS	
TRAFFIC INFORMATION AT THE BEGINNING (INITIAL VALUE)	
TRAFFIC INFORMATION ENCODED BY THE DIFFERENCE VALUE FROM STATISTICAL PREDICTION VALUE. INCLUDES THE FOLLOWING INFORMATION; <ul style="list-style-type: none"> <li>· SECTION LENGTH CHANGE CODE AND SECTION LENGTH AFTER CHANGE</li> <li>· TRAFFIC INFORMATION QUANTIZATION TABLE CHANGE CODE AND TABLE NUMBER AFTER CHANGE</li> <li>· IDENTIFICATION CODE FOR THE POINT CORRESPONDING TO REFERENCE NODE AND CORRESPONDING REFERENCE NODE NUMBER+OFFSET DISTANCE</li> </ul>	
§	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=W	
§	



FIG. 9

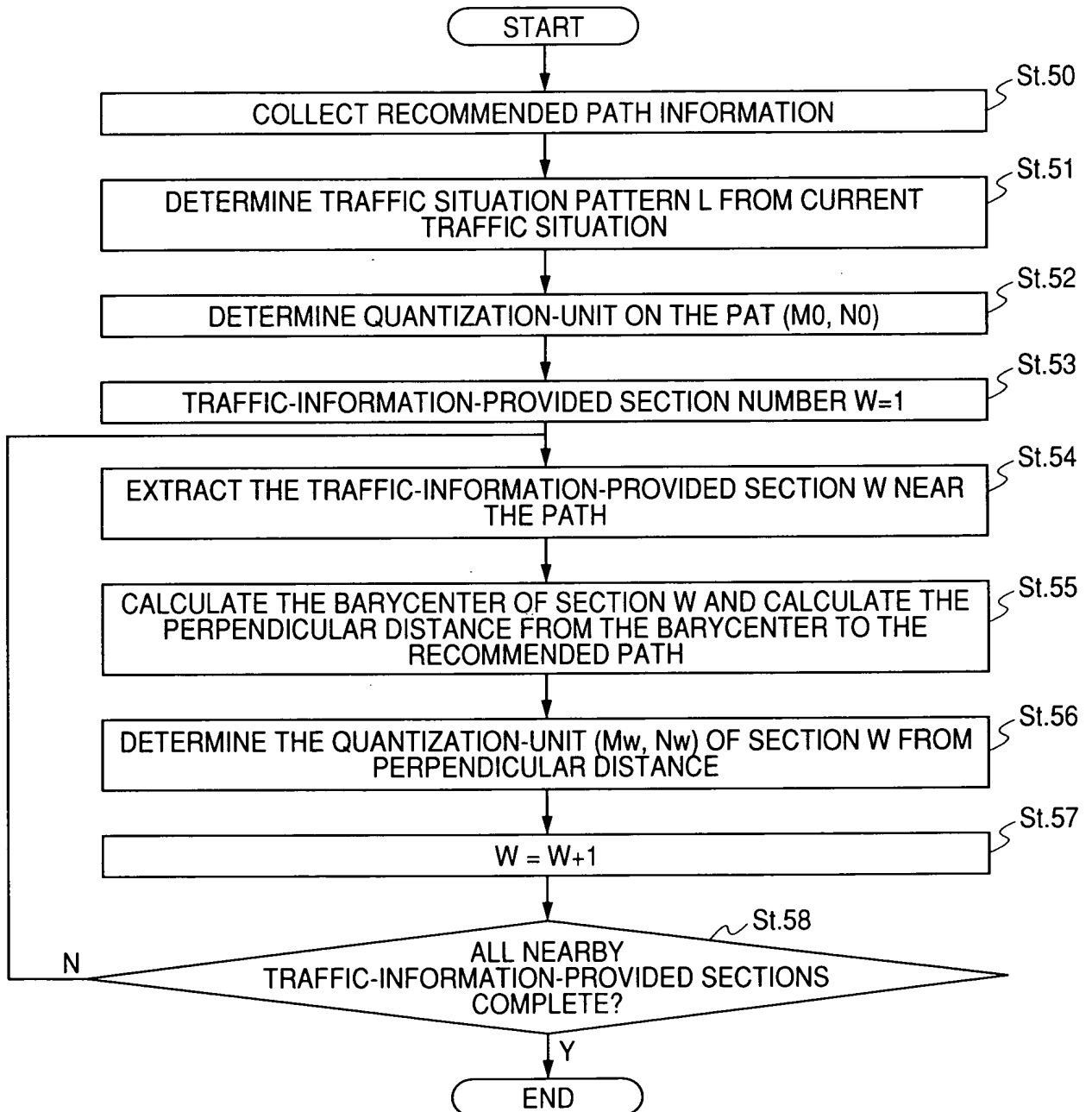


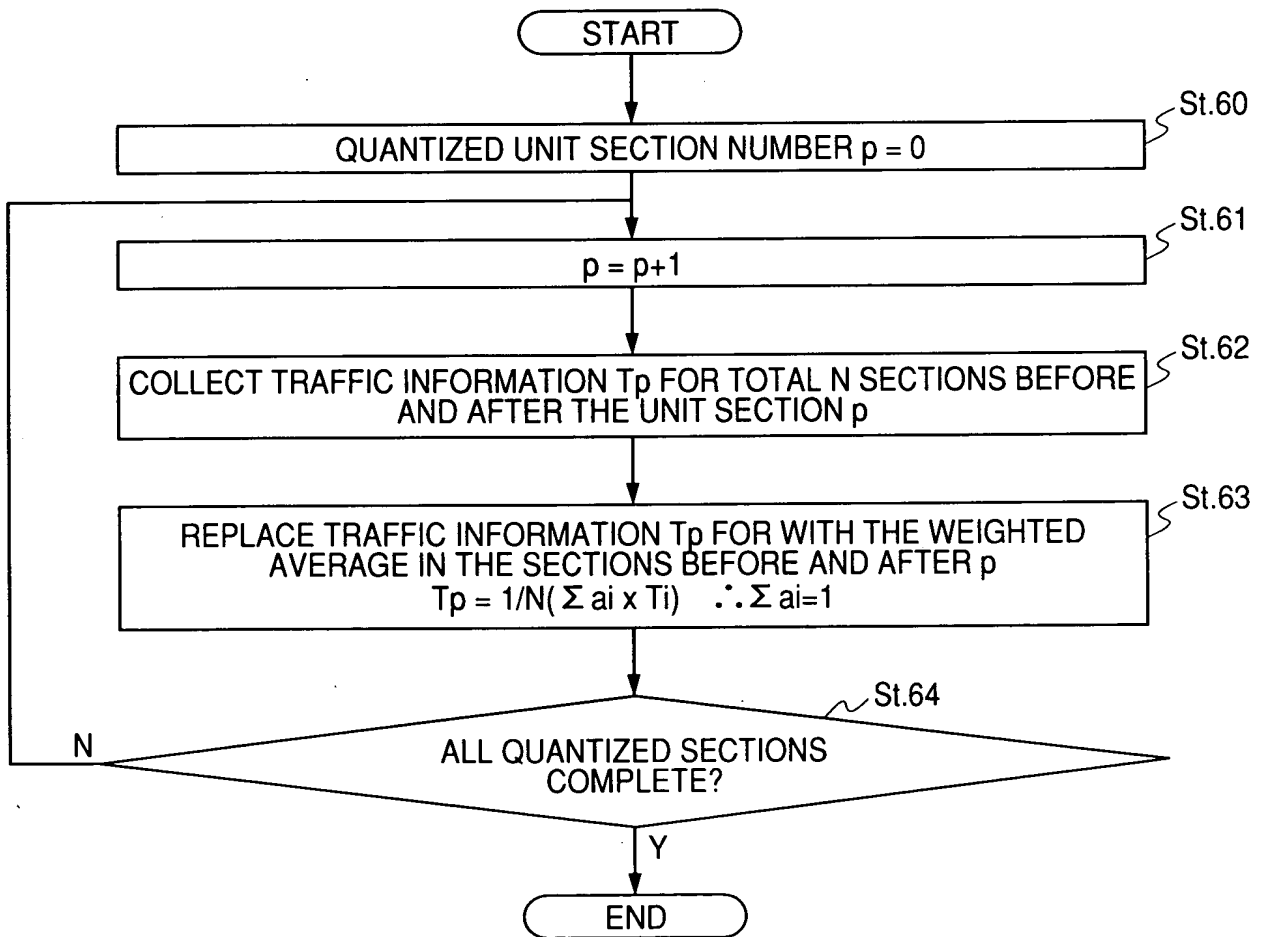
*FIG. 10(a)*

TARGET DATA EXPANSION RATIO	IMPORTANCE OF INFORMATION A	IMPORTANCE OF INFORMATION B	IMPORTANCE OF INFORMATION C	REMARKS
DEFAULT	RANK 2	RANK 3	RANK 4	—
×2.0 OR ABOVE	+1 RANK	+2 RANK	+3 RANK	DETAILED
×1.6–1.9	±0 RANK	+1 RANK	+2 RANK	↑
×1.1–1.3	±0 RANK	±0 RANK	+1 RANK	↑
×1.0	±0 RANK	±0 RANK	±0 RANK	NOT CHANGED
×0.7–0.9	±0 RANK	±0 RANK	–1 RANK	↓
×0.6–0.5	±0 RANK	–1 RANK	–2 RANK	↓
×0.4 OR BELOW	–1 RANK	–2 RANK	–3 RANK	SIMPLIFIED

*FIG. 10(b)*

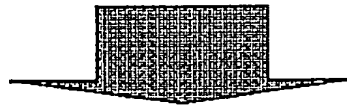
QUANTIZATION- UNIT RANK	DISTANCE DIRECTION QUANTIZATION-UNIT M	TRAFFIC INFORMATION QUANTIZATION TABLE N	DETAIL LEVEL
RANK 1	50m	TABLE 1	DETAILED
RANK 2	100m	TABLE 2	RATHER DETAILED
RANK 3	150m	TABLE 2	STANDARD
RANK 4	200m	TABLE 3	RATHER COARSE
RANK 5	200m	TABLE 4	COARSE

**FIG. 11**

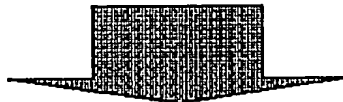
**FIG. 12**

*FIG. 13(a)*

PEAK (DIFFERENCE FROM TRAFFIC  
INFORMATION VOLUME IN THE PRECEDING/SUBSEQUENT  
SECTION EXCEEDS THE PRESPECIFIED VALUE)

*FIG. 13(b)*

DIP (DIFFERENCE FROM TRAFFIC  
INFORMATION VOLUME IN THE PRECEDING/SUBSEQUENT  
SECTION EXCEEDS THE PRESPECIFIED VALUE)



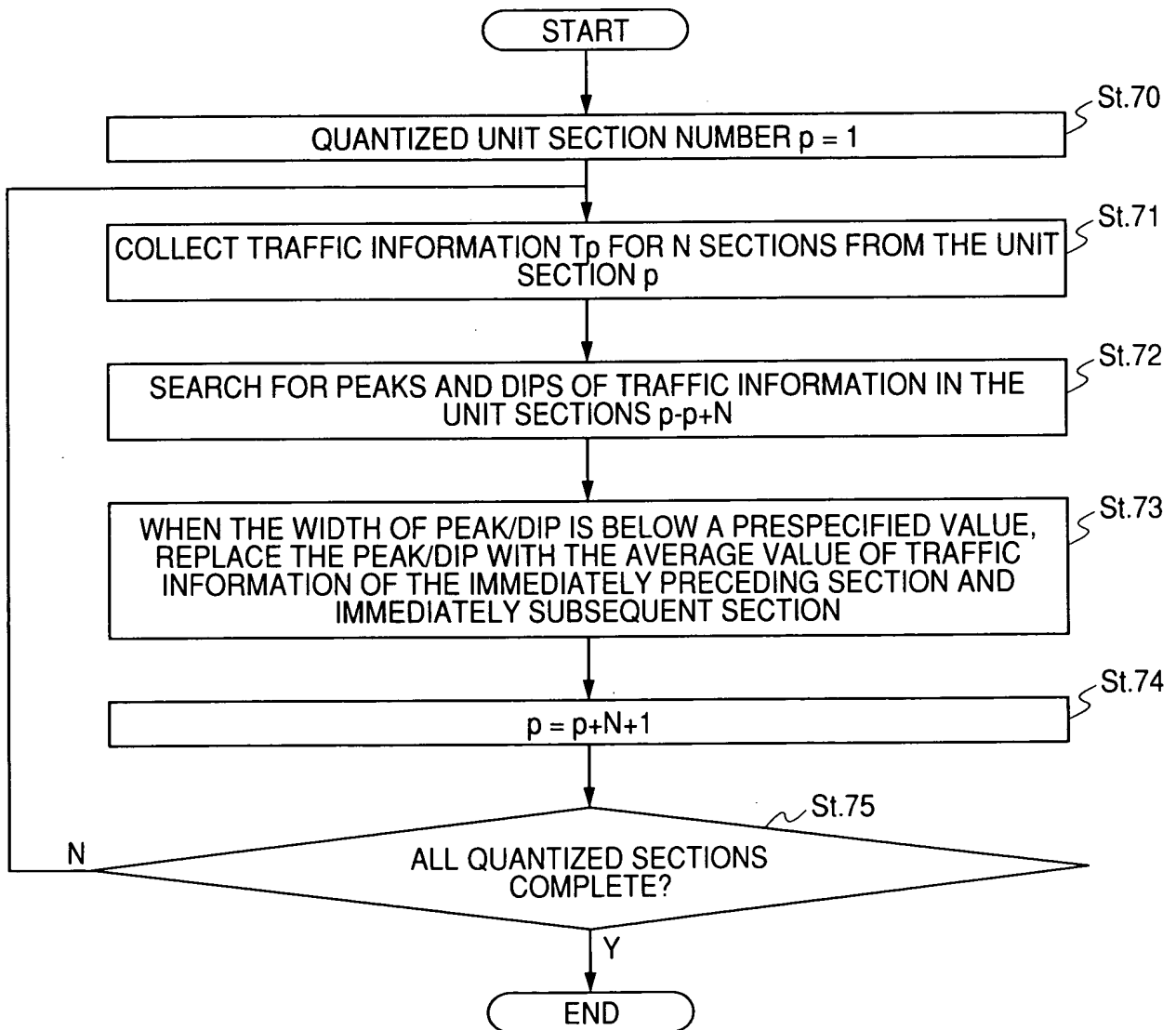
**FIG. 14**

FIG. 15(d)

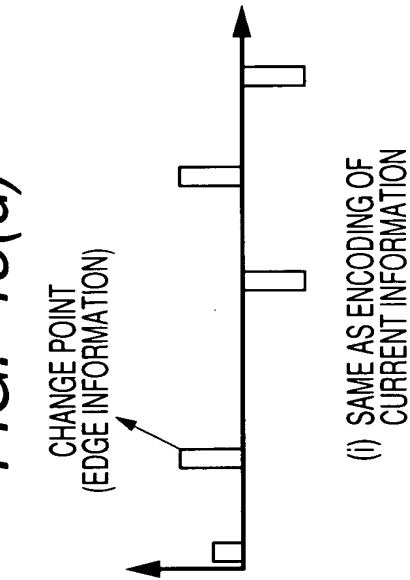


FIG. 15(a)

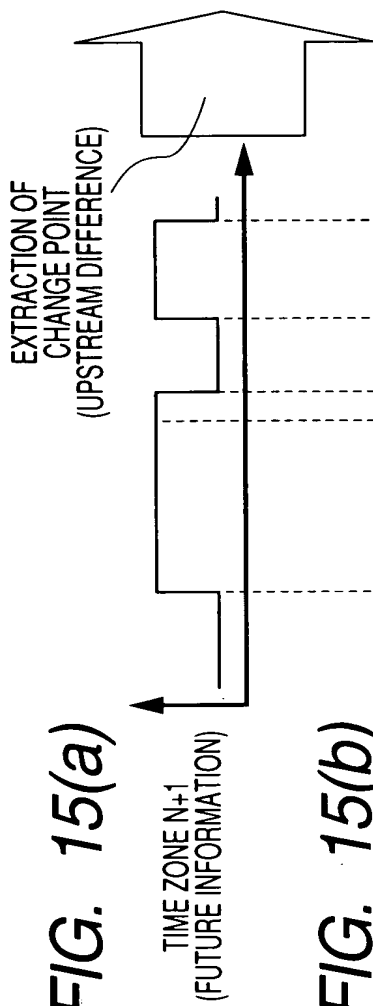


FIG. 15(b)

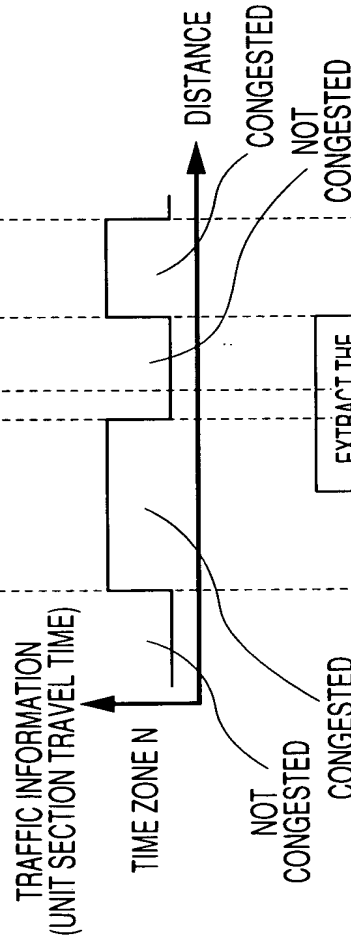


FIG. 15(e)

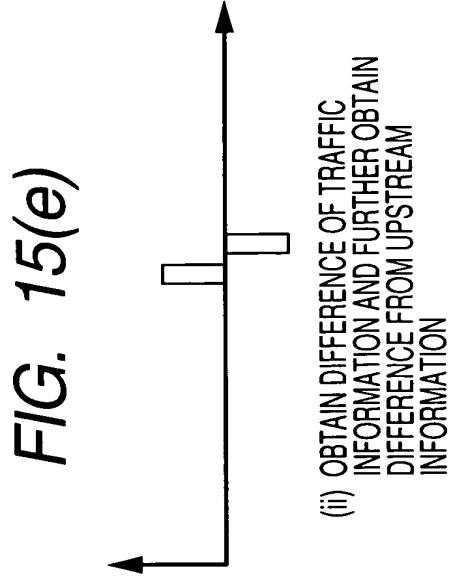


FIG. 15(c)

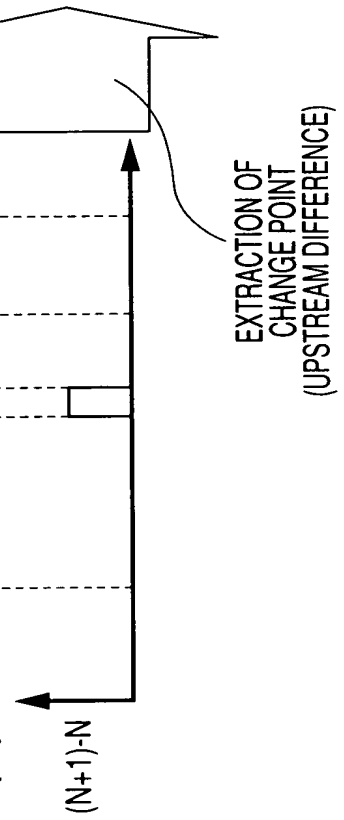


FIG. 16(a)

1. ORIGINAL TRAFFIC INFORMATION (CURRENT MEASUREMENT VALUE+PREDICTION INFORMATION OF NEXT TIME ZONE)

[illegible]

FIG. 16(b)

- ## 2. QUANTIZED REPRESENTATION OF TRAFFIC INFORMATION

71	6	7	6	9	8	5	7	6	7	6	8	6	7	5	108	151	118	6	5	6
6	5	7	7	7	8	9	9	9	9	9	10	10	10	10	11	11	11	4	4	6

**FIG. 16(c)**

3. REPRESENT PREDICTION INFORMATION BY THE DIFFERENCE FROM CURRENT INFORMATION (CURRENT INFORMATION IS REPRESENTED BY THE DIFFERENCE FROM AN ADJACENT UNIT SECTION)
- |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 0 | 1 | 4 | 0 | 4 | 2 |
|---|---|---|---|---|---|---|---|
- CONCENTRATION RATES AROUND  $\pm 0$  FROM CORRELATION LAW B

4	2	0	1	4	0	2	5	4	8	0	2	1	0
6	4	1	0	4	0	4	0	3	0	1	0	0	2

**FIG. 16(d)**

4. REPRESENT PREDICTION INFORMATION BY THE DIFFERENCE FROM AN ADJACENT UNIT SECTION

[illegible]



*FIG. 17(a)*

SPECIAL CODE		CODE	ADDITIONAL BIT	
SECTION LENGTH CHANGE CODE		101	3 (40/80/160/.../5120m)	
TRAFFIC INFORMATION QUANTIZATION TABLE CHANGE CODE		111110	4 (TABLE NUMBER)	
IDENTIFICATION CODE FOR A POINT CORRESPONDING TO REFERENCE NODE		1100	6 (CORRESPONDING REFERENCE NODE NUMBER) + 8 (OFFSET DISTANCE FROM REFERENCE NODE)	
ENCODING TABLE FOR STATISTICAL PREDICTION DIFFERENCE VALUES OF TRAFFIC INFORMATION		CODE	ADDITIONAL BIT I	ADDITIONAL BIT II (RANGE)
RUN LENGTH	CHANGE VOLUME			
0	0	0	0	-
5	0	100	0	-
10	0	1101	0	-
0	$\pm 1$	1110	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 2$	111100	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 4$	111101	1 ( $\pm$ IDENTIFICATION)	1 (3 OR 4)
s				

*FIG. 17(b)*

SPECIAL CODE		CODE	ADDITIONAL BIT	
NOT				
ENCODING TABLE FOR STATISTICAL PREDICTION DIFFERENCE VALUES OF PREDICTION INFORMATION		CODE	ADDITIONAL BIT I	ADDITIONAL BIT II (RANGE)
RUN LENGTH	CHANGE VOLUME			
0	0	0	0	-
5	0	100	0	-
10	0	1101	0	-
0	±1	1110	1 (±IDENTIFICATION)	0
0	±2	111100	1 (±IDENTIFICATION)	0
0	±4	111101	1 (±IDENTIFICATION)	1 (3 OR 4)
S				

FIG. 18

EXAMPLE OF APPARATUS CONFIGURATION  
(APPLICATION TO CAR NAVIGATION SYSTEM)

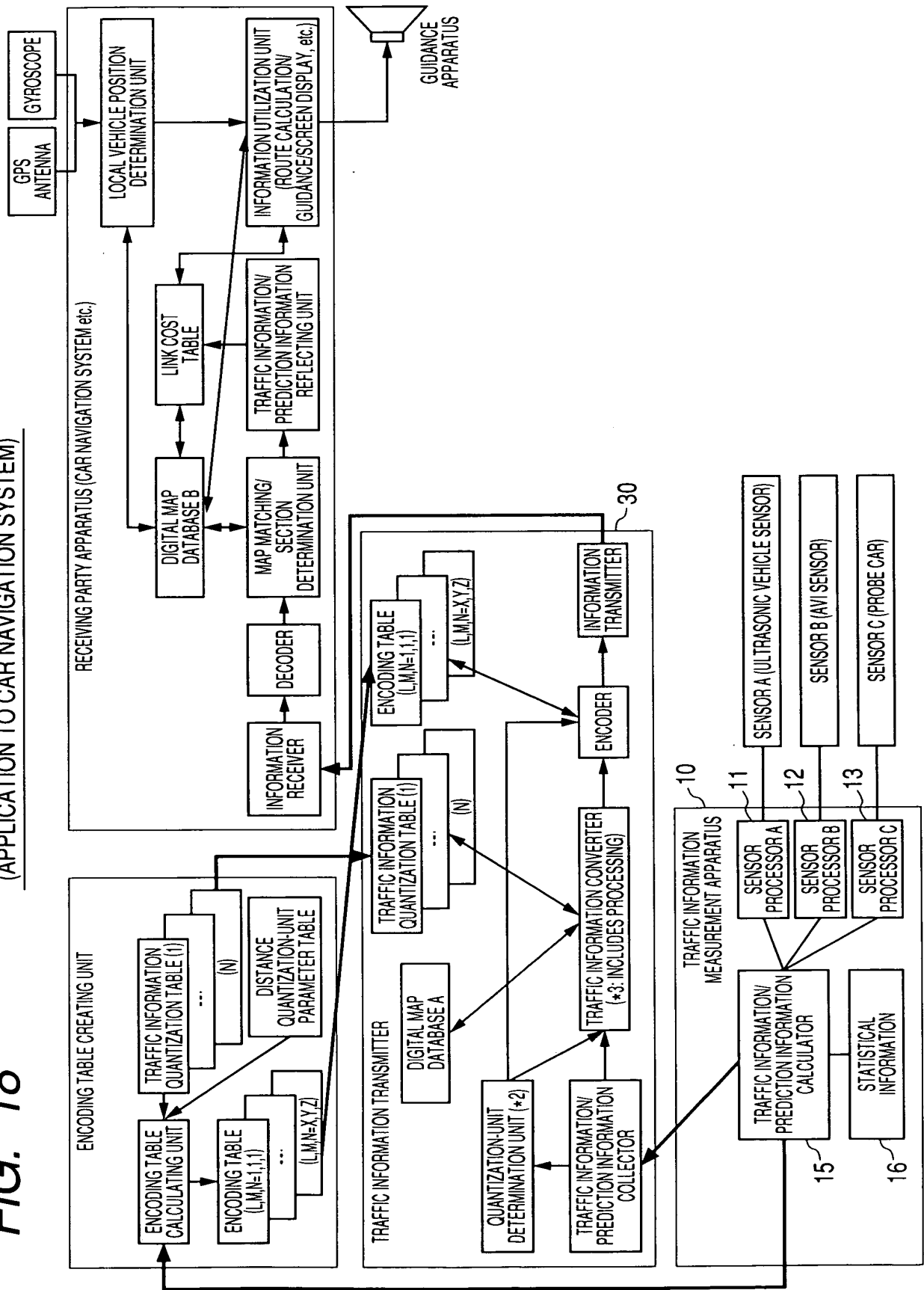
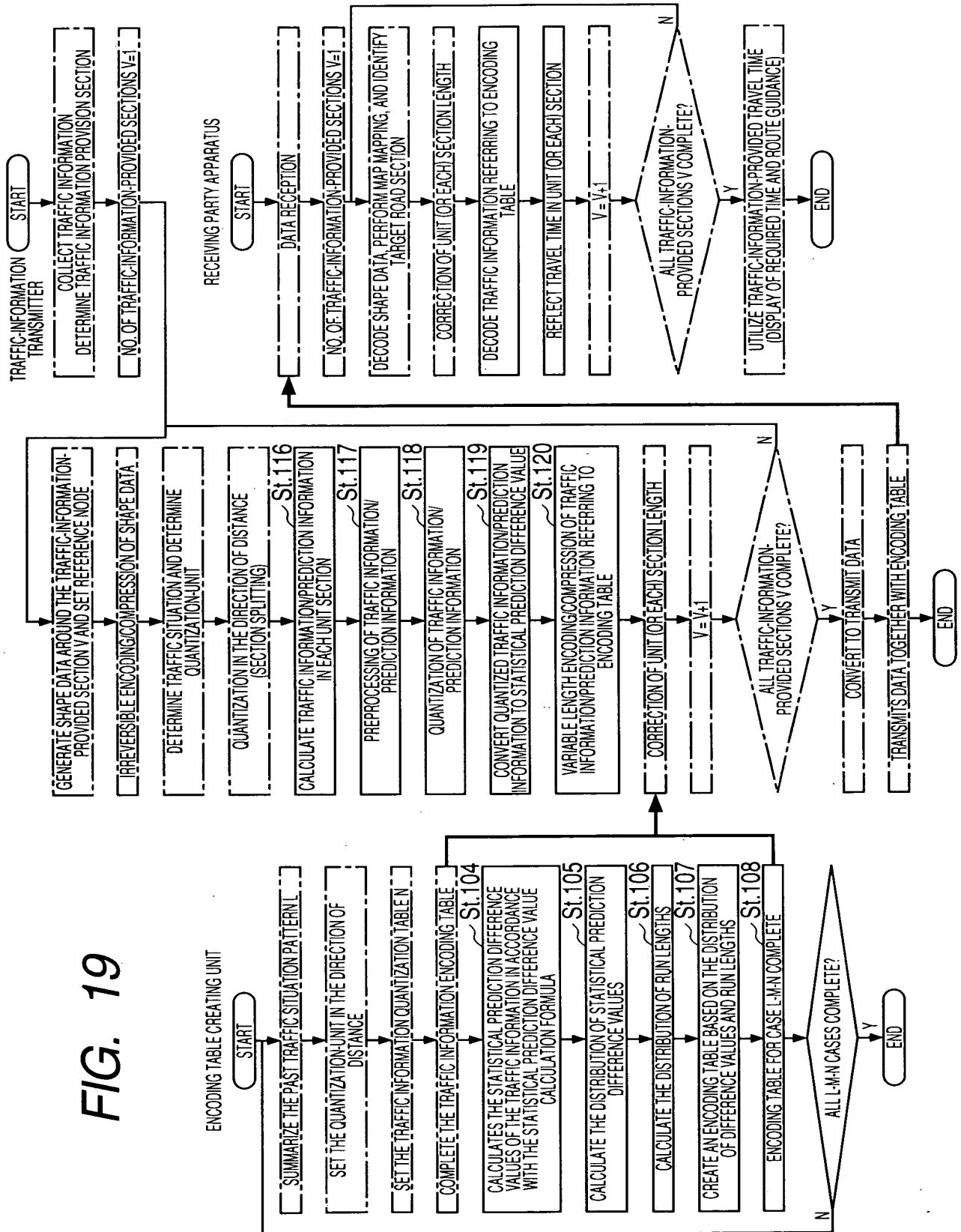


FIG. 19



**FIG. 20(a)**

## SHAPE DATA STRING INFORMATION

HEADER INFORMATION	
NO. OF SHAPE DATA N	
SHAPE DATA IDENTIFICATION NUMBER=1	
ENCODING TABLE IDENTIFICATION CODE	
ACCURACY INFORMATION OF MAP DATA AT SHAPE SOURCE	
DIRECTION OF ONE-WAY TRAFFIC (FORWARD/BACKWARD/NONE)	
BEGINNING NODE NUMBER ps	
NODE ps X DIRECTION ABSOLUTE COORDINATE (LONGITUDE)	
NODE ps Y DIRECTION ABSOLUTE COORDINATE (LATITUDE)	
NODE ps ABSOLUTE BEARING	
ps POSITION ERROR (m)	ps BEARING ERROR (°)
MAXIMUM POSITION ERROR OF ENCODED SHAPE DATAT (m)	MAXIMUM BEARING ERROR OF ENCODED SHAPE DATAT (°)
ENCODED SHAPE DATA INCLUDES THE FOLLOWING INFORMATION: <ul style="list-style-type: none"> <li>· REFERENCE NODE SETTING CODE</li> <li>· SECTION LENGTH CHANGE CODE</li> <li>· EOD CODE</li> </ul>	
END NODE NUMBER pe	
NODE pe X DIRECTION RELATIVE COORDINATE (LONGITUDE)	
NODE pe Y DIRECTION RELATIVE COORDINATE (LATITUDE)	
NODE pe ABSOLUTE BEARING	
pe POSITION ERROR (m)	pe BEARING ERROR (°)
§	
SHAPE DATA IDENTIFICATION NUMBER=M	
§	

**FIG. 20(b)**

## TRAFFIC INFORMATION

HEADER INFORMATION	
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE Pa	END REFERENCE NODE Pb
DISTANCE DIRECTION QUANTIZED SECTION LENGTH IDENTIFICATION CODE	
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
CURRENT INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
PREDICTION INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
NO. OF QUANTIZED UNIT SECTIONS	
NO. OF TIME ZONES OF PREDICTION INFORMATION	
EFFECTIVE TIME OF CURRENT INFORMATION (HH:MM)	
TRAFFIC INFORMATION AT THE BEGINNING (INITIAL VALUE)	
CURRENT TRAFFIC INFORMATION ENCODED USING STATISTICAL PREDICTION DIFFERENCE VALUE FROM AN ADJACENT POINT	
EFFECTIVE TIME OF PREDICTION INFORMATION 1 (HH:MM)	
PREDICTION TRAFFIC INFORMATION ENCODED USING THE DIFFERENCE FROM PRECEDING TIME ZONE AND STATISTICAL PREDICTION DIFFERENCE VALUE FROM AN ADJACENT POINT	
§	
EFFECTIVE TIME OF PREDICTION INFORMATION Q (HH:MM)	
PREDICTION TRAFFIC INFORMATION ENCODED USING THE DIFFERENCE FROM PRECEDING TIME ZONE AND STATISTICAL PREDICTION DIFFERENCE VALUE FROM AN ADJACENT POINT	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=2	
§	

FIG. 21(a)

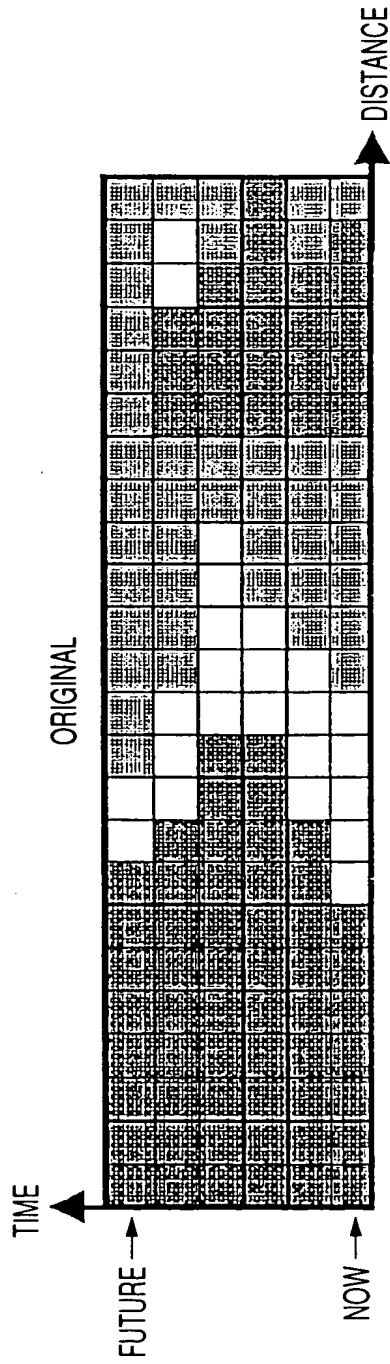


FIG. 21(b)

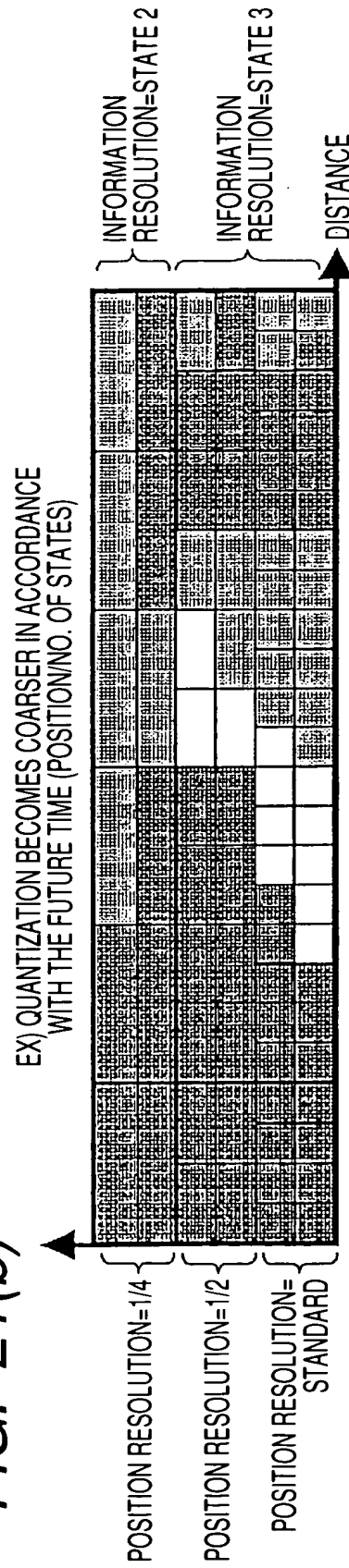


FIG. 22(a)

0. ORIGINAL TRAFFIC INFORMATION (CURRENT MEASUREMENT  
VALUE-PREDICTION INFORMATION IN THE NEXT TIME ZONE)

7	6	7	6	9	8	5	7	6	7	5	6	5
6	8	7	7	8	8	9	9	6	12	11	11	4

PREDICTION INFORMATION IN THE NEXT  
TIME ZONE (PREDICTION 1) →  
CURRENT INFORMATION (NOW) →

FIG. 22(b)

1. REDUCE THE POSITION RESOLUTION TO HALF  
(AVERAGE THE TRAFFIC INFORMATION AND  
ROUND UP THE FRACTIONAL PORTION)

7	7	9	6	7	9	7	6	6	6	6	6	6
6	8	7	8	8	9	9	9	9	12	11	11	4

FIG. 22(c)

2. PERFORM QUANTIZATION BY USING  
A DETAILED QUANTIZATION TABLE

7	7	9	6	7	9	7	6	6	6	6	6	6
6	8	7	8	8	9	9	9	9	12	11	11	4

FIG. 22(d)

3. PERFORM QUANTIZATION BY USING  
A COARSE QUANTIZATION TABLE

4	4	5	3	4	5	4	5	4	5	4	5	2
5	4	4	4	4	4	5	5	5	6	6	6	2

FIG. 22(e)

4. EXTRACT THE DIFFERENCE IN THE  
DIRECTION OF TIME BY USING A  
COARSE QUANTIZATION TABLE

0	0	+1	-2	-2	2	4	4	4	4	4	4	+1
3	4	4	4	4	4	4	4	4	5	6	6	2

FIG. 22(f)

5. EXTRACT THE DIFFERENCE FROM  
UPSTREAM BY USING RESPECTIVE  
QUANTIZATION TABLES

0	0	+1	3	0	0	2	0	0	0	0	0	0
5	+2	-1	0	+1	0	+1	0	0	+2	+1	-1	0

**FIG. 23**

TRAFFIC INFORMATION QUANTIZATION TABLE  
(SPEED QUANTIZATION TABLE)

SPEED (km/h)	QUANTIZED VOLUME (CURRENT)	QUANTIZED VOLUME (PREDICTION 1)	QUANTIZED VOLUME (PREDICTION 2)
0	0	0	0
1	1	1	1
2	2		
3	3	2	
4	4		
5	5	3	2
6	6		
7	7	4	
8	8		
9	9	5	3
10~11	10		
12~13	11	6	
14~15	12		
16~17	13	7	4
18~19	14		
20~24	15	8	
25~29	16		
30~34	17	9	5
35~39	18		
40~44	19	10	
45~49	20		
50~59	21	11	6
60~69	22		
70~79	23	12	
80~99	24		
}			
200 OR MORE	30	15	8 (180km/h OR MORE)

**FIG. 24**

## TRAFFIC INFORMATION

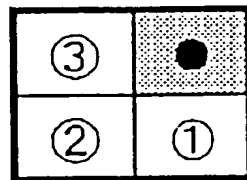
HEADER INFORMATION	
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE Pa	END REFERENCE NODE Pb
DISTANCE DIRECTION QUANTIZED SECTION LENGTH IDENTIFICATION CODE	
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
CURRENT INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
PREDICTION INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
NO. OF QUANTIZED UNIT SECTIONS	
NO. OF TIME ZONES OF PREDICTION INFORMATION	
EFFECTIVE TIME OF CURRENT INFORMATION (HH:MM)	
TRAFFIC INFORMATION AT THE BEGINNING (INITIAL VALUE)	
CURRENT TRAFFIC INFORMATION ENCODED BY THE DIFFERENCE VALUE FROM STATISTICAL PREDICTION VALUE	
EFFECTIVE TIME OF PREDICTION INFORMATION 1 (HH:MM)	
POSITION RESOLUTION IDENTIFICATION CODE	QUANTIZATION TABLE NUMBER
PREDICTION TRAFFIC INFORMATION ENCODED BY THE DIFFERENCE VALUE FROM STATISTICAL PREDICTION VALUE	
§	
EFFECTIVE TIME OF PREDICTION INFORMATION Q (HH:MM)	
POSITION RESOLUTION IDENTIFICATION CODE	QUANTIZATION TABLE NUMBER
PREDICTION TRAFFIC INFORMATION ENCODED BY THE DIFFERENCE VALUE FROM STATISTICAL PREDICTION VALUE	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=2	
§	

★

★



*FIG. 25*



STATISTICAL PREDICTION VALUE OF ● =  $a① + b② + c③$  (WHERE  $a+b+c=1$ )

OR =  $(① + ③) \div 2$

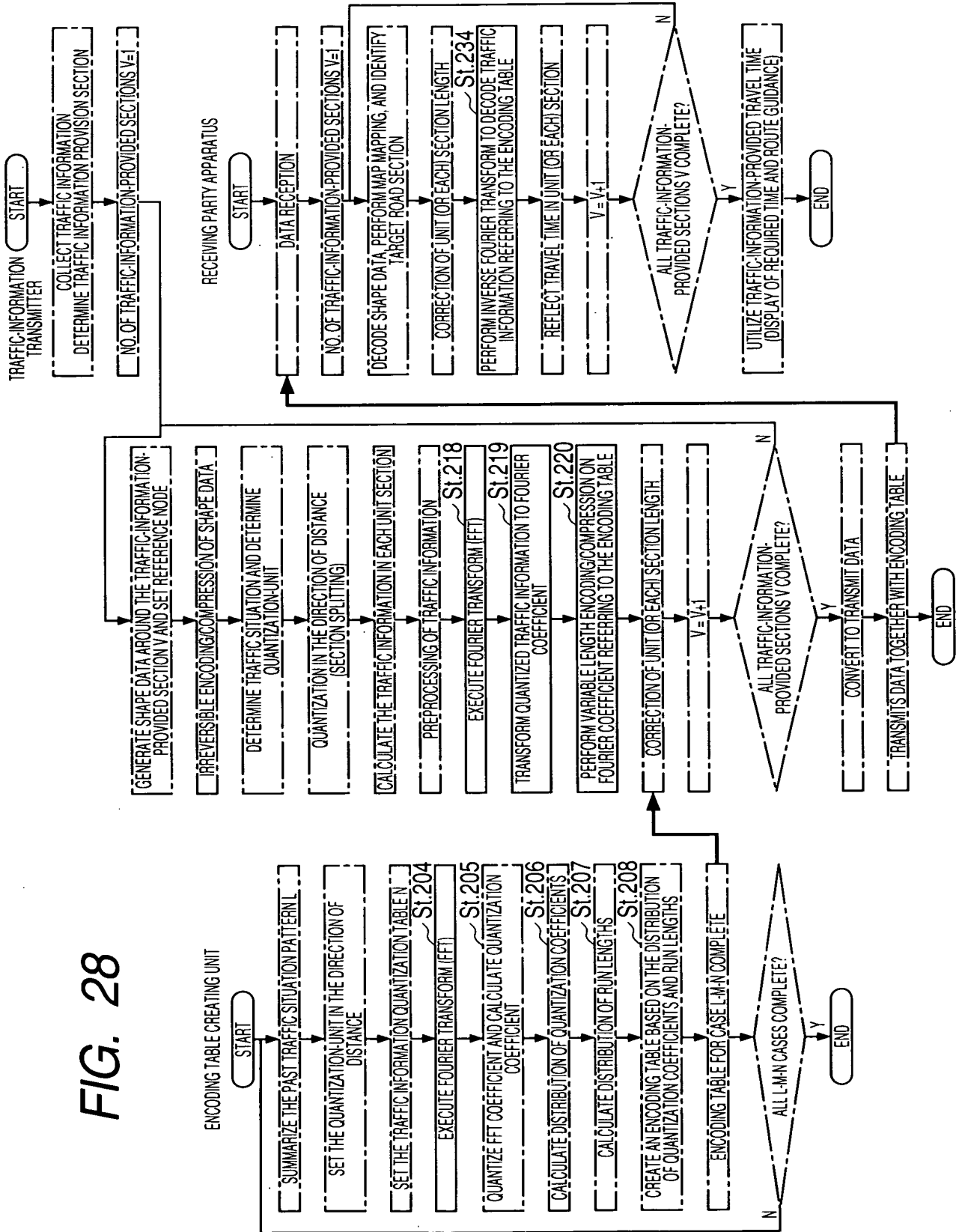
FIG. 26

① ORIGINAL TRAFFIC INFORMATION DATA		② FFT PROCESSING ON THE TRANSMITTER (ENCODER)		③ QUANTIZATION TABLE		④ TRANSMIT DATA		⑤ INVERSE FFT PROCESSING ON THE RECEIVER (DECODER)		⑥ REPRODUCED TRAFFIC INFORMATION DATA		⑦ DIFFERENCE BETWEEN ORIGINAL DATA AND REPRODUCED DATA	
SPEED INFORMATION	CONGESTION INFORMATION	IMAGINARY REPRESENTATION OF ORIGINAL DATA	FFT COEFFICIENT AFTER FFT	QUANTIZATION	REAL PART QUANTIZATION COEFFICIENT	FFT QUANTIZATION COEFFICIENT	IMAGINARY REPRESENTATION OF RECEIVED DATA	INVERSE FFT COEFFICIENT AFTER INVERSE FFT	SPEED INFORMATION	CONGESTION INFORMATION	SPEED INFORMATION	CONGESTION INFORMATION	
6	10	6+10i	733+710i	4	183	178	732+712i	5.75+7.625i	6	8	6	-2	
8	10	8+10i	-148.621280158602-272.74558887757i	4	-37	68	-149+72i	5.8052548203367+8.52067305321167i	6	9	6	-1	
7	10	7+10i	-181.863753223699+137.34315451237i	4	-45	34	-180+136i	6.23420537707197+10.5005693367913i	6	11	6	1	
7	10	7+10i	-55.4713983314211-53.4484277168883i	4	-14	-13	-56-52i	4.98101229726206+9.37963294127272i	5	9	5	-1	
8	10	8+10i	26.941125469544+120.225396744416i	4	7	30	28+120i	6.57223230470037+9.69822300470336i	7	10	7	0	
8	10	8+10i	-145.18811985525-0.96171618333575i	4	-36	0	-144	6.476254638239+10.2678775231286i	6	10	6	0	
9	10	9+10i	0.190731976517859-15.5222872819433i	8	0	-2	-16i	5.42212789881637+11.570897252852i	5	12	5	-4	
9	10	9+10i	-40.901700165513+42.9151819467876i	8	-5	5	-40+40i	9.60303478897502+13.546449478559i	10	14	10	4	
9	10	9+10i	-43-1.99399989999999i	8	-5	0	-40	10.25+11.375i	10	11	10	1	
12	20	12+20i	-54.8878835465916-20.30482353517509i	8	-7	-3	-56-24i	12.3363273925689+20.4980722500786i	12	20	12	0	
12	20	12+20i	-14.3874741515445-8.38147222871013i	8	-2	-1	-16-8i	13.183548753522+7.18443947771475i	13	22	13	2	
17	20	17+20i	-39.751338029533+5.30246359471074i	8	-5	1	-40-8i	18.4482141858231+17.8589282303024i	18	18	18	1	
18	20	18+20i	-9.2253987444162-32.3431437305075i	16	-1	-3	-16-48i	17.4362915010152+18.5183982822018i	17	19	17	-1	
22	20	22+20i	-10.7100733289521+24.672184685353i	16	-1	2	-16+32i	18.4819285012168+20.2722369810842i	18	20	18	0	
26	20	26+20i	-54.8564177147756-9.88802548368202i	16	-3	-1	-48-16i	25.958985734648+21.247459001796i	26	21	26	0	
32	20	32+20i	6.72547424221385-31.6849567666283i	16	0	-2	-32i	30.9783456873555+20.9676867300298i	31	21	31	1	
34	20	34+20i	-19-10i	16	-1	-1	-16-16i	34+22.375i	34	22	34	0	
34	20	34+20i	-23.8895463768037-1.92475231338796i	16	-1	0	-16	35.4245017907487+21.5758249081537i	35	22	35	2	
4+10i		4+10i	-27.1316960424174-35.6032000870692i	32	-1	-1	-32-32i	37.1160092966191+9.77386409468866i	4	10	4	0	
4+10i		4+10i	19.5410942063395-19.8773345808547i	32	-1	-1	32-32i	5.59046498433584+12.57360856443211i	6	13	6	3	
6+10i		6+10i	-40.941125469543-4.22539674441614i	32	-1	0	-32	6.9267766952866+10.0517766952966i	7	10	7	0	
7+10i		7+10i	3.86346683891288-50.425876885859i	32	0	-2	-64i	8.67432416713155+12.9347385137643i	9	13	9	3	
41+40i		41+40i	7.1828611522894+26.1152163945066i	32	0	1	32i	43.7767267351224+38.7596536493211i	44	39	44	-1	
46+40i		46+40i	-45.9968033955987-35.2649030736415i	32	-1	-1	-32i	47.848662535459+39.2058071703952i	48	39	48	2	
46+40i		46+40i	-3.00000000000002-58i	32	0	-2	-64i	48.38.625i	48	39	48	-1	
38+40i		38+40i	6.81142858298211-29.3788361327705i	32	0	-1	-32i	37.9442529747343+37.1731967415224i	38	37	38	0	
43+40i		43+40i	3.88242351766113+2.6413568585356i	64	0	0	0	42.708439377441+38.3813171913725i	42	38	42	-2	
44+40i		44+40i	-40.7691513342155-119.916701298968i	64	-1	-2	-64-126i	42.4282703323508+39.5728208061088i	42	40	42	0	
40+40i		40+40i	115.225396744416-63.6568542494925i	64	2	-1	128-64i	40.0637084989847+39.731601717992i	40	40	40	0	
45+40i		45+40i	-91.2780121723207+19.8548572239245i	64	-1	0	-64	45.9070062451838+40.1573800290584i	46	41	46	1	
48+40i		48+40i	147.282824585968-256.724903628891i	64	2	-4	128-256i	48.3412467925964+37.9216715822364i	48	33	48	0	
43+40i		43+40i	212.623822808768-163.964322106318i	64	3	-3	192-192i	43.3219952086377+38.80487050860311i	43	33	43	-1	

FIG. 27

① ORIGINAL TRAFFIC INFORMATION DATA		② FFT PROCESSING ON THE TRANSMITTER (ENCODER)		③ QUANTIZATION TABLE		④ TRANSMIT DATA		⑤ INVERSE FFT PROCESSING ON THE RECEIVER (DECODER)		⑥ REPRODUCED TRAFFIC INFORMATION DATA		⑦ DIFFERENCE BETWEEN ORIGINAL DATA AND REPRODUCED DATA	
SPEED INFORMATION	CONGESTION INFORMATION	IMAGINARY REPRESENTATION OF ORIGINAL DATA	FFT COEFFICIENT AFTER FFT	QUANTIZATION TABLE	FFT REAL PART COEFFICIENT	FFT IMAGINARY PART COEFFICIENT	QUANTIZATION COEFFICIENT	IMAGINARY REPRESENTATION OF RECEIVED DATA	INVERSE FFT COEFFICIENT AFTER INVERSE FFT	SPEED INFORMATION	CONGESTION INFORMATION	SPEED INFORMATION	CONGESTION INFORMATION
6	10	6+10i	733-710i	1	733	710		733+710i	6.125+9.0625i	6	10	0	0
8	10	8+10i	-148.521280158602+272.743589877571i	1	-149	273		-149+273i	7.83584653307734+9.914046260840811i	8	10	0	0
7	10	7+10i	-181.863253323699+137.343315457237i	1	-182	137		-182+137i	6.7619318309866+10.2317953874i	7	10	0	0
7	10	7+10i	-55.4713383319211-53.4484277168883i	1	-55	-53		-55-53i	7.32835127918787+10.5062773120751i	7	11	0	1
8	10	8+10i	26.9411254669544+120.22336744416i	1	27	120		27+120i	8.20932765030735+9.98169417382415i	8	10	0	0
8	10	8+10i	-145.180118853325+0.961716183533575i	1	-145	1		-145+1i	8.18580381859386+9.78320767533622i	8	10	0	0
9	10	9+10i	0.190731976517859-19.5222872819433i	1	0	-16		-16i	8.75920685770712+9.95194658570465i	9	10	0	0
9	10	9+10i	-40.501700165513+42.91518467876i	1	-41	43		-41+43i	9.36655308744802+10.3939434767754i	9	10	0	0
9	10	9+10i	-43-1.99999999999999i	2	-22	-1		-4-2i	9.43750000000001+10.03125i	9	10	0	0
12+20i		-54.8878935485916-20.3048255517508i		2	-22	-10		-5-4-20i	12.3785026290064+19.8115974881206i	12	20	0	0
12+20i		-14.5874741515445-8.3814722871013i		2	-7	-4		-1-4-8i	12.1384947423615+19.6588010321639i	12	20	0	0
17+20i		-39.7513368029535+5.30246359471074i		2	-20	3		-4-0-6i	17.0969218083576+19.766881185662i	17	20	0	0
18+20i		-9.2253967444162-32.3431437050575i		2	-5	-26		-1-0-52i	17.87601370136+19.765274989709i	18	20	0	0
22+20i		-10.7100733399521+24.6722184685535i		2	-5	12		-1-0-24i	22.2422829603499+19.80262620654219i	22	20	0	0
26+20i		-54.956417714756-9.86802546368202i		2	-27	-5		-5-4-10i	25.8666134921883+19.2785860749779i	26	19	0	-1
32+20i		6.72547424221385-31.6849567666283i		2	3	-16		6-32i	31.3618699248675+19.744220432985i	31	20	-1	0
34+20i		-19-10i		4	-5	-3		-20-12i	33.375+20.03125i	33	20	-1	0
34+20i		-23.9885463768037-1.92475231338756i		4	-6	0		-24	33.859205656747+20.2144116879571i	34	20	0	0
4+10i		-27.131686042174-35.603200870592i		4	-7	-9		-28-36i	3.9928708208739+10.0699089132008i	4	10	0	0
4+10i		19.5410942063395-19.8773345808547i		4	5	-5		20-20i	4.01415042944684+10.5218714515286i	4	11	0	1
6+10i		-40.8411254969543-4.22538674441614i		4	-10	-1		-40-4i	6.33317234869266+8.89330582617583i	6	10	0	0
7+10i		3.8634685881286-50.42587685859i		4	1	-13		4-52i	7.0156619415876+9.32582863293567i	7	10	0	0
41+40i		7.3828611522894+26.1152163945066i		4	2	7		8-28i	40.9882898882974+39.668388457462i	41	40	0	0
46+40i		-45.996803955987-35.2639030736415i		4	-11	-9		-4-4-36i	45.7309644994616+40.2489517725244i	46	40	0	0
46+40i		-3.00000000000002-58i		8	0	-7		-56i	45.8125+40.03125i	46	40	0	0
33+40i		6.8114785829811-29.3789316137705i		8	1	-4		8-32i	37.9860274865302+40.0480783789936i	33	40	0	0
43+40i		3.58242351766113+2.641356853256i		8	0	0		0	42.8152863435422+40.1584946672321i	43	40	0	0
44+40i		-40.7691513342156-119.976701296958i		8	-5	-15		-40-120i	43.7093634973042+40.194105993465i	44	40	0	0
40+40i		115.223396744416-43.6568542494925i		8	14	-8		112-64i	40.0814878298939+40.3597475010291i	40	40	0	0
45+40i		-91.2180121723207+19.6548572238245i		8	-11	2		-88+16i	45.2466666841078+40.1832058103321i	45	40	0	0
48+40i		147.282824583968-256.724803828881i		8	18	-32		144-256i	48.0108339718072+39.9760788718353i	48	40	0	0
43+40i		212.823822808768-163.964322106518i		8	27	-20		216-160i	43.1418247329253+40.1243383748905i	43	40	0	0

FIG. 28



*FIG. 29*

EXAMPLE OF TRAFFIC INFORMATION IN FFT REPRESENTATION

HEADER INFORMATION	
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE $P_a$	END REFERENCE NODE $P_b$
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
ENCODING TABLE IDENTIFICATION CODE	
AMOUNT OF SECTION SPLITTING BETWEEN REFERENCE NODES $2^N$	
DATA STRING WHERE FOURIER COEFFICIENTS ARE VARIABLE LENGTH ENCODED IN THE ORDER OF REAL PART TO IMAGINARY PART, AND LOW FREQUENCIES TO HIGH FREQUENCIES	
§	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=W	
§	

FIG. 30

EXAMPLE OF ENCODING TABLE OF FFT COEFFICIENTS

SPECIAL CODE		CODE	ADDITIONAL BIT	
EOD CODE		1100	NOT	
ENCODING TABLE		CODE	ADDITIONAL BIT I	ADDITIONAL BIT II (RANGE)
RUN LENGTH	FFT COEFFICIENTS			
0	0	0	0	-
5	0	100	0	-
10	0	1101	0	-
0	$\pm 1$	1110	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 2$	111100	1 ( $\pm$ IDENTIFICATION)	0
0	$\pm 3-6$	111101	1 ( $\pm$ IDENTIFICATION)	2 (3/4/5/6 IDENTIFICATION)
}				

## FIG. 31(a)

EXAMPLE OF TRAFFIC INFORMATION IN FFT REPRESENTATION 2  
(LOW FREQUENCY COMPONENT/HIGH FREQUENCY COMPONENT SPLIT TYPE)

HEADER INFORMATION	
NO. OF THIS INFORMATION	AMOUNT OF TRAFFIC INFORMATION SPLITTING
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE Pa	END REFERENCE NODE Pb
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
ENCODING TABLE IDENTIFICATION CODE	
AMOUNT OF SECTION SPLITTING BETWEEN REFERENCE NODE $2^N$	
DATA STRING WHERE FOURIER COEFFICIENTS ARE VARIABLE LENGTH ENCODED IN THE ORDER OF REAL PART TO IMAGINARY PART, COEFFICIENTS OF BASE FUNCTION TO HIGHT FREQUENCIES	
}	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=W	
}	

BASIC INFORMATION & INFORMATION ON FFT COEFFICIENTS  
OF LOW FREQUENCY COMPONENT

## FIG. 31(b)

HEADER INFORMATION	
NO. OF THIS INFORMATION ※	AMOUNT OF TRAFFIC INFORMATION SPLITTING ※
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
DATA STRING WHERE FOURIER COEFFICIENTS ARE VARIABLE LENGTH ENCODED IN THE ORDER OF REAL PART TO IMAGINARY PART, COEFFICIENTS OF BASE FUNCTION TO HIGHT FREQUENCIES	
}	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=W	
}	

INFORMATION ON FFT COEFFICIENTS  
OF HIGH FREQUENCY COMPONENT  
(PART OF SUBSECTIONS)

FIG. 32(a)

ORDINARY DATA TRANSMISSION ORDER  
(DATA IS SEQUENTIALLY TRANSMITTED IN THE ORDER TO LOW FREQUENCY COMPONENTS  
TO HIGH FREQUENCY COMPONENTS IN ASCENDING ORDER OF SECTION NUMBER)

INFORMATION (FFT COEFFICIENT) IN SECTION NO.=1		INFORMATION (FFT COEFFICIENT) IN SECTION NO.=2		INFORMATION (FFT COEFFICIENT) IN SECTION NO.=V	
REAL PART	IMAGINARY PART	REAL PART	IMAGINARY PART	REAL PART	IMAGINARY PART
45	64	-13	87	53	16
34	-22	8	-32	-89	45
25	-7	5	27	14	-22
0	6	-4	-4	0	19
-2	0	0	3	0	-21
-14	0	0	0	0	-6
3	-4	0	-9	0	0
0	0	0	0	-5	-3
0	1	0	6	9	0
0	12	0	8	8	0
-2	-5	4	12	4	6
0	0	0	0	0	-12
-1	0	2	0	3	0
3	1	-4	3	5	-3
-2	-7	0	-2	0	0
0	0	0	-1	1	4
0	0	0	7	-3	0
0	0	3	0	-2	1
-6	0	0	0	0	0
3	6	6	0	0	0
4	0	0	4	0	0
1	0	-2	-1	0	-2

FIG. 32(b)

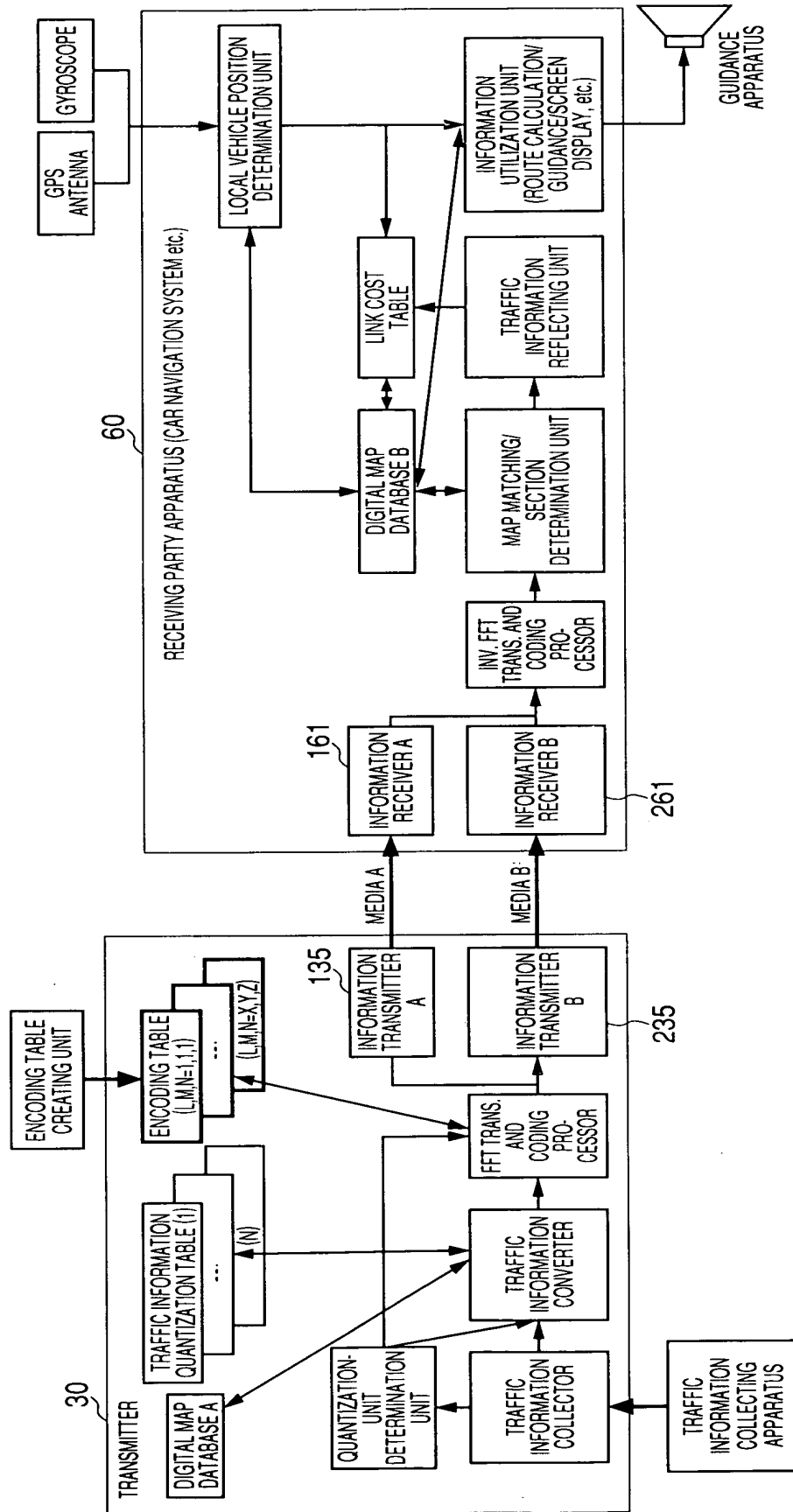
DATA TRANSMISSION ORDER ACCORDING TO THIS SYSTEM  
(LOW FREQUENCY COMPONENTS IN ALL SECTIONS ARE TRANSMITTED,  
THEN HIGH FREQUENCY COMPONENTS ARE SEQUENTIALLY TRANSMITTED)

INFORMATION (FFT COEFFICIENT) IN SECTION NO.=1		INFORMATION (FFT COEFFICIENT) IN SECTION NO.=2		INFORMATION (FFT COEFFICIENT) IN SECTION NO.=V	
REAL PART	IMAGINARY PART	REAL PART	IMAGINARY PART	REAL PART	IMAGINARY PART
45	64	-13	87	53	16
34	-22	8	-32	-89	45
25	-7	5	27	14	-22
0	6	-4	-4	0	19
-2	0	0	3	0	-21
-14	0	0	0	0	-6
3	-4	0	-9	0	0
0	0	0	0	-5	-3
0	1	0	6	9	0
0	12	0	8	8	0
-2	-5	4	12	4	6
0	0	0	0	0	-12
-1	0	2	0	3	0
3	1	-4	3	5	-3
-2	-7	0	-2	0	0
0	0	0	-1	1	4
0	0	0	7	-3	0
0	0	3	0	-2	1
-6	0	0	0	0	0
3	6	6	0	0	0
4	0	0	4	0	0
1	0	-2	-1	0	-2



FIG. 33

## EXAMPLE OF APPARATUS CONFIGURATION



*FIG. 34(a)*

## ORIGINAL INFORMATION

HEADER INFORMATION	
NO. OF THIS INFORMATION	AMOUNT OF TRAFFIC INFORMATION SPLITTING
NO. OF TRAFFIC-INFORMATION-PROVIDED SECTIONS	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
REFERENCE SHAPE DATA STRING NUMBER=N	
DIRECTION IDENTIFICATION FLAG (FORWARD/BACKWARD)	
BEGINNING REFERENCE NODE Pa	END REFERENCE NODE Pb
DISTANCE DIRECTION QUANTIZED SECTION LENGTH IDENTIFICATION CODE	
TRAFFIC INFORMATION QUANTIZATION TABLE IDENTIFICATION CODE	
CURRENT INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
PREDICTION INFORMATION: ENCODING TABLE IDENTIFICATION CODE	
NO. OF QUANTIZED UNIT SECTIONS	
NO. OF TIME ZONES OF PREDICTION INFORMATION	
EFFECTIVE TIME OF CURRENT INFORMATION (HH:MM)	
TRAFFIC INFORMATION AT THE BEGINNING (INITIAL VALUE)	
CURRENT TRAFFIC INFORMATION ENCODED USING THE STATISTICAL PREDICTION DIFFERENCE VALUE FROM AN ADJACENT POINT	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=2	
§	

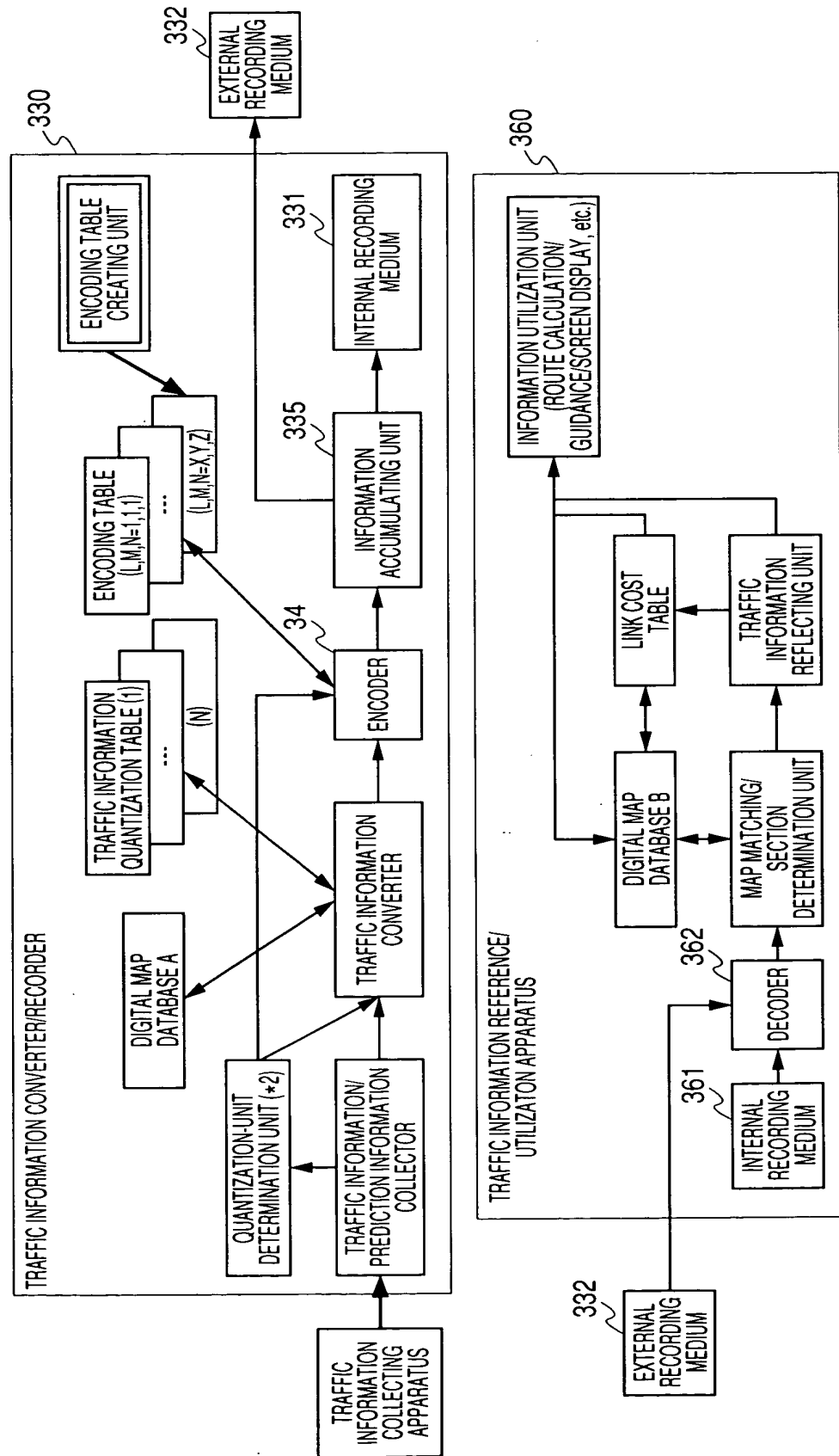
*FIG. 34(b)*

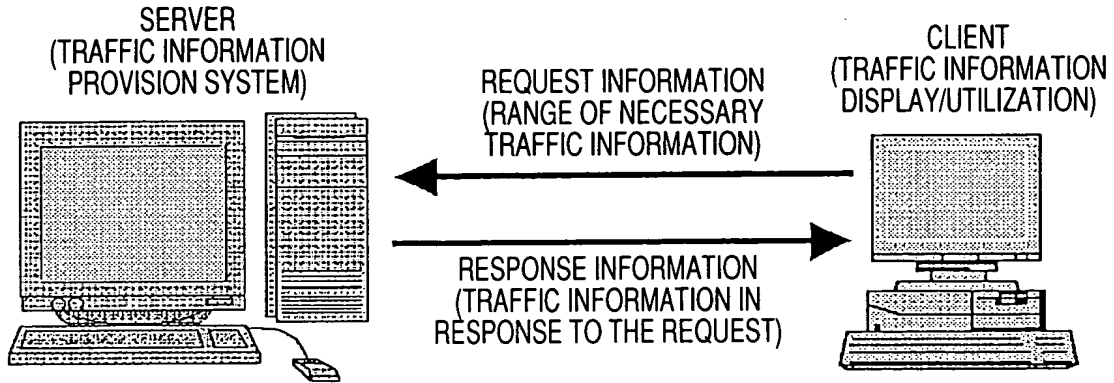
## DIFFERENCE INFORMATION FROM PRECEDING TIME ZONE

HEADER INFORMATION	
NO. OF THIS INFORMATION	AMOUNT OF TRAFFIC INFORMATION SPLITTING
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER 1	
ENCODING TABLE IDENTIFICATION CODE	
EFFECTIVE TIME OF PREDICTION INFORMATION Q (HH:MM)	
CURRENT TRAFFIC INFORMATION ENCODED USING THE DIFFERENCE FROM PRECEDING TIME ZONE AND STATISTICAL PREDICTION DIFFERENCE VALUE FROM AN ADJACENT POINT	
TRAFFIC-INFORMATION-PROVIDED SECTION SERIAL NUMBER=2	
§	

FIG. 35

EXAMPLE OF APPARATUS CONFIGURATION  
(APPLICATION TO PC OR OPERATION SYSTEM)



*FIG. 36**FIG. 37*

INFORMATION TRANSMITTED FROM CLIENT  
TO SERVER <REQUEST INFORMATION>

HEADER INFORMATION (USER ID, ETC.)
DESIRED MAXIMUM DATA SIZE ※1
LATITUDE/LONGITUDE OF LOWER LEFT/UPPER RIGHT OF RECTANGLE ※2
CENTER POINT ※2
PREFECTURAL/COMMUNAL CODE ※2
ROAD SPECIFICATION (ROAD ATTRIBUTE, ETC.) ※2
LATITUDE/LONGITUDE OF BEGINNING/END FOR PATH SEARCH REQUEST ※3
LATITUDE/LONGITUDE OF CURRENT POSITION + TRAVEL DIRECTION ※3

FIG. 38

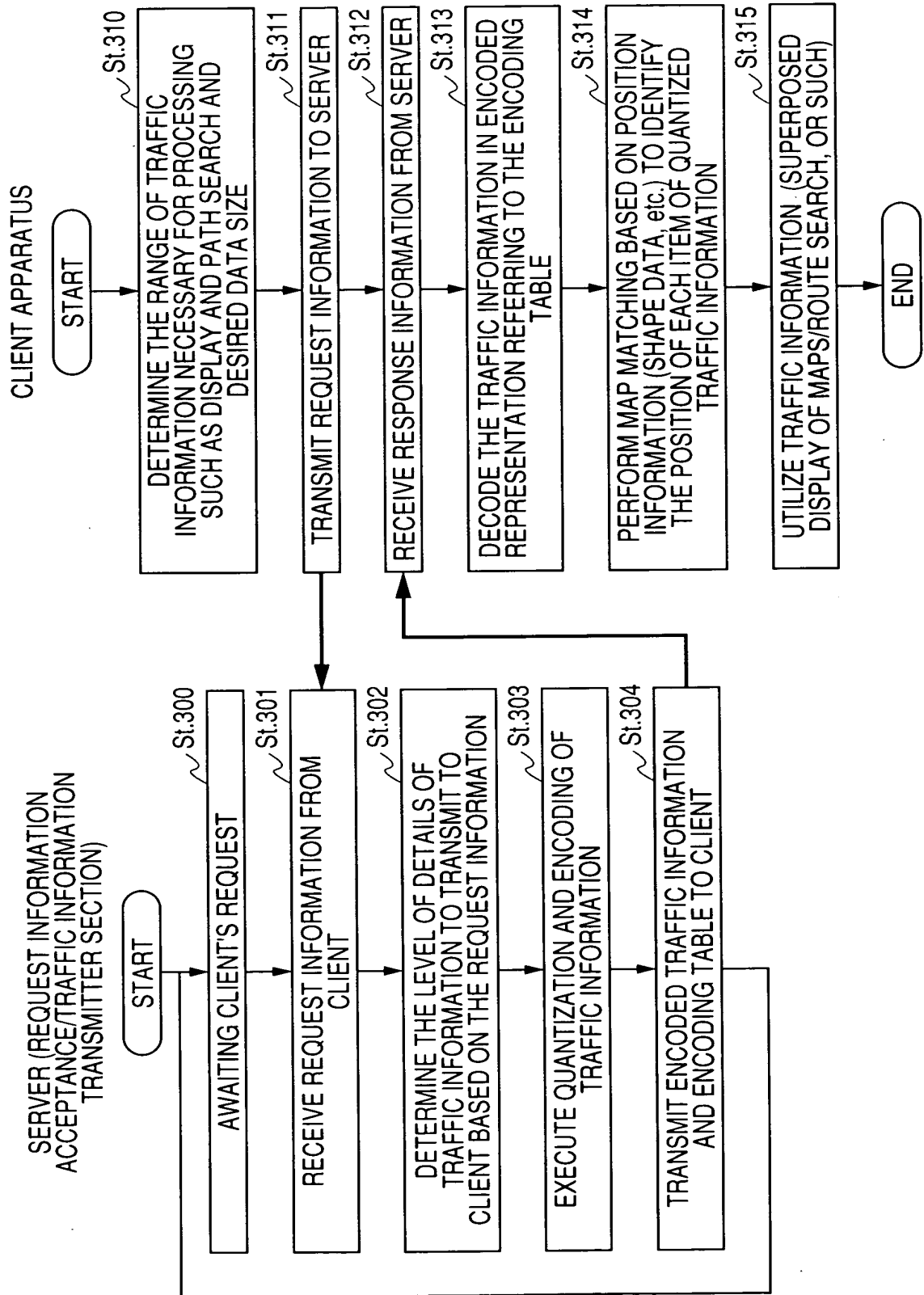


FIG. 39

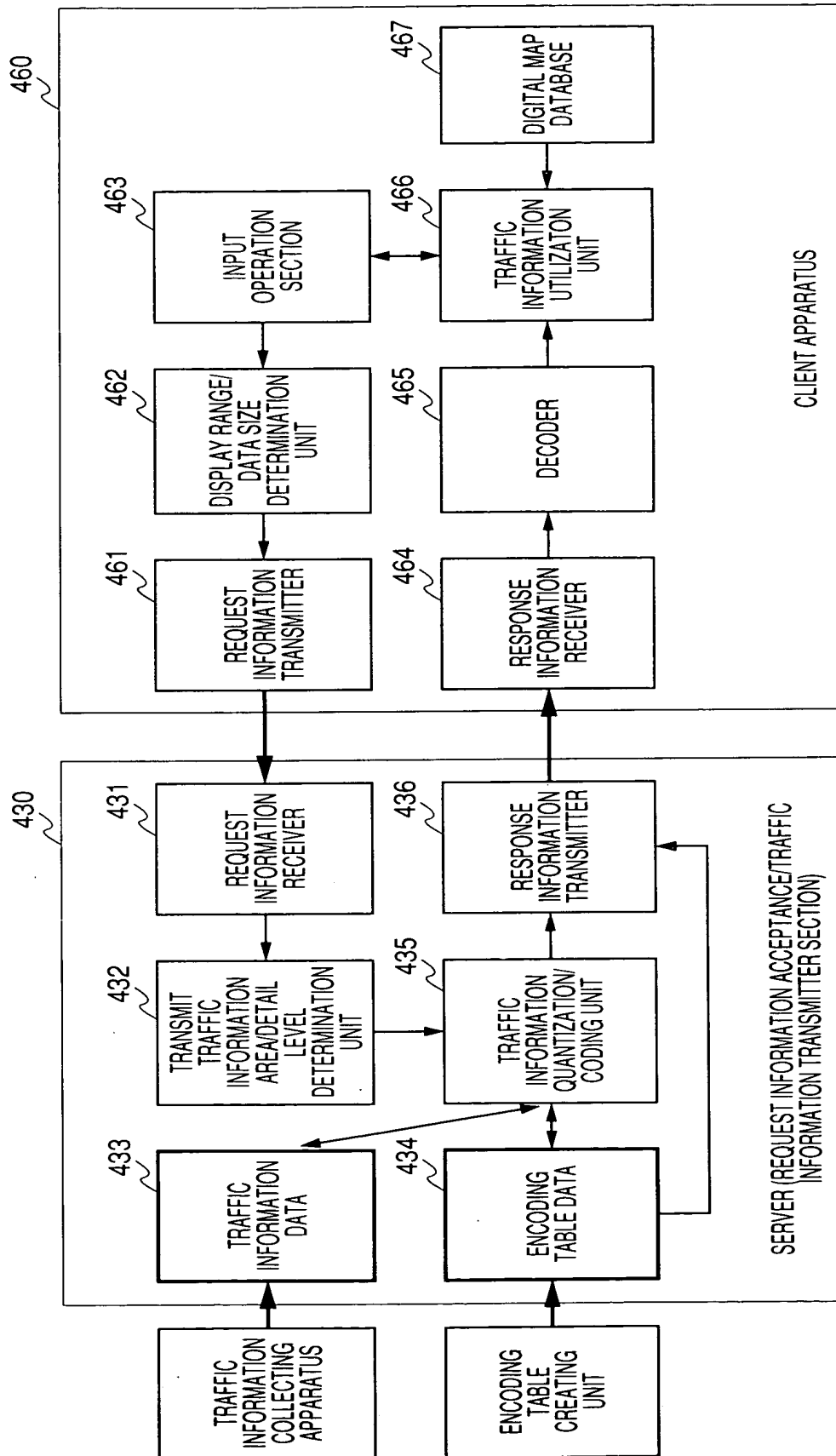
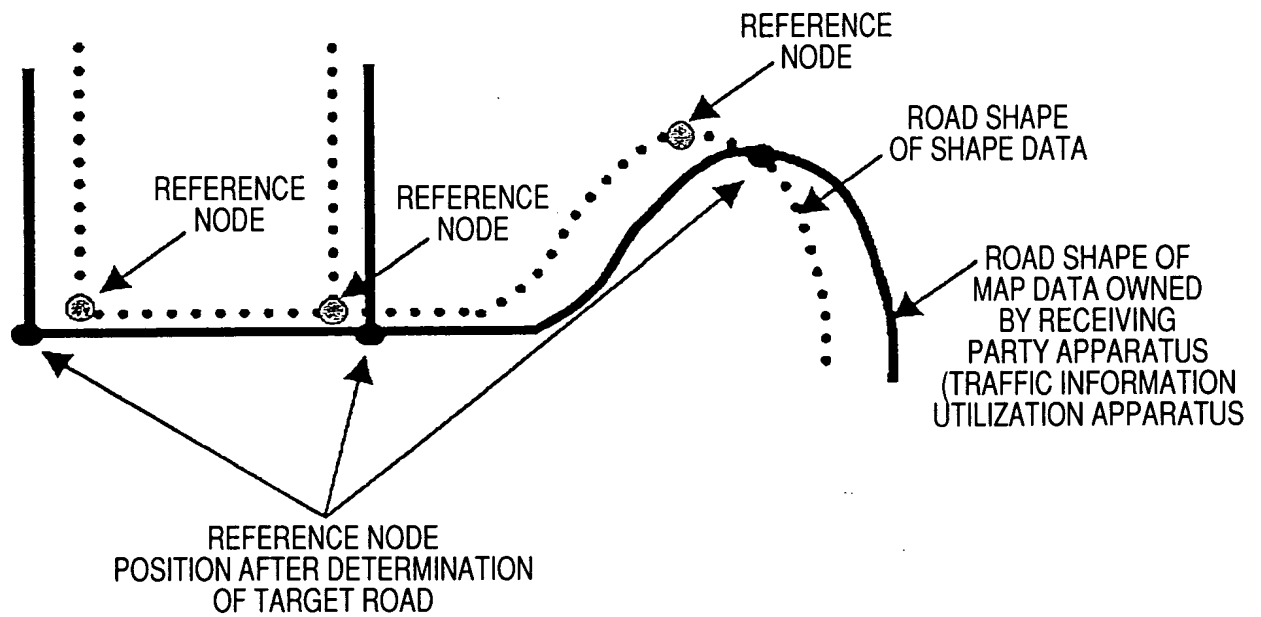


FIG. 40



*FIG. 41*

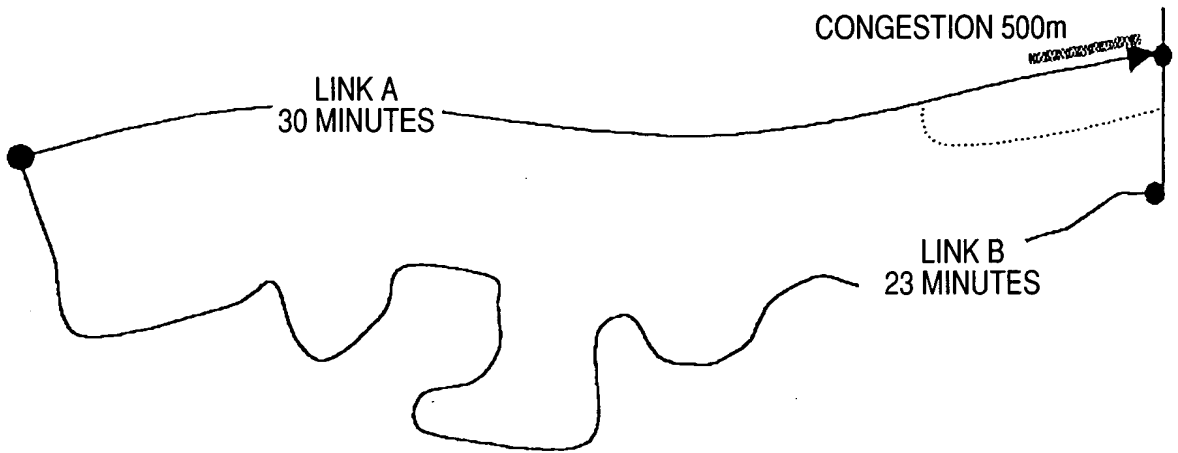




FIG. 42

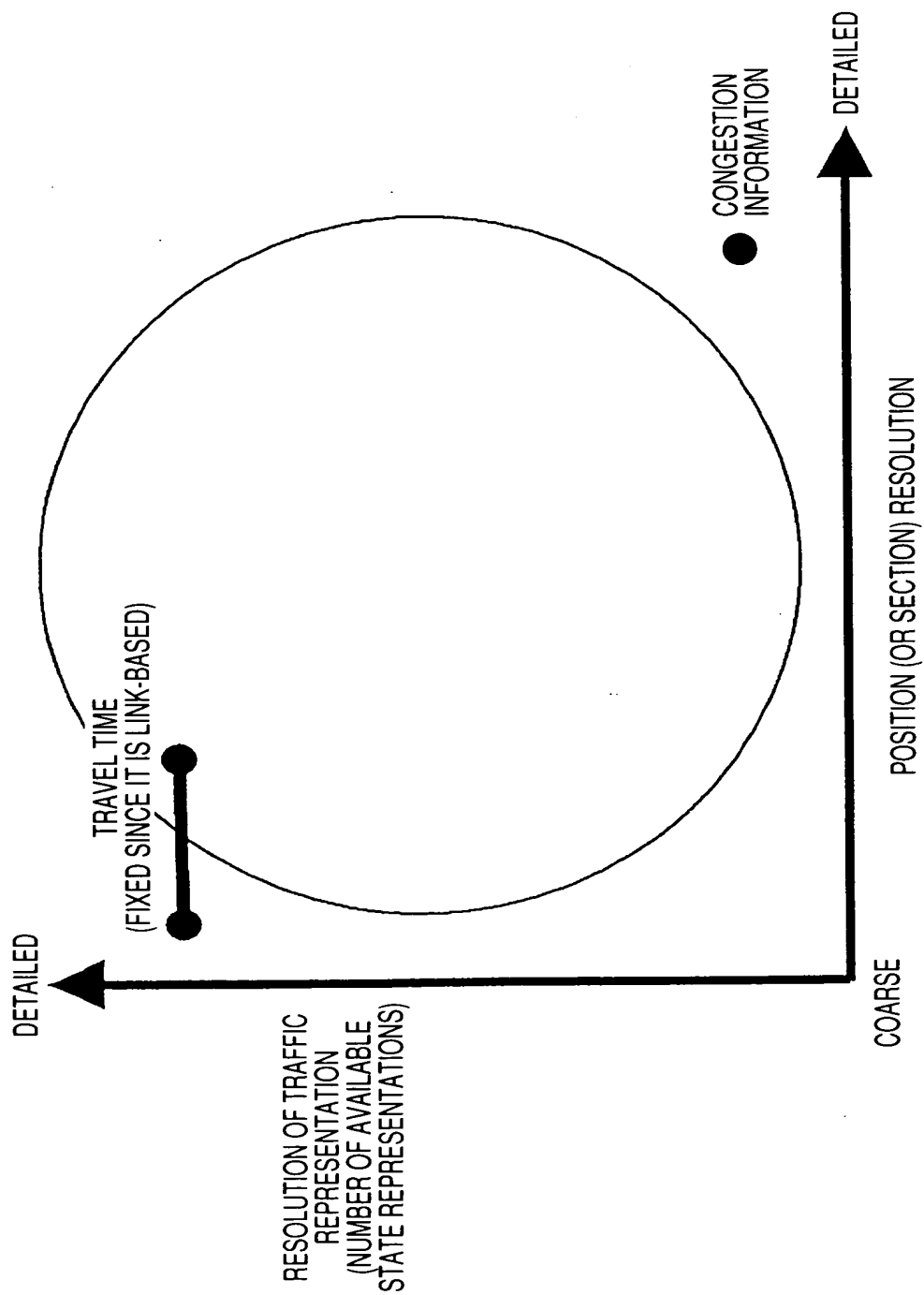


FIG. 43(a)

CURRENT LINK SYSTEM

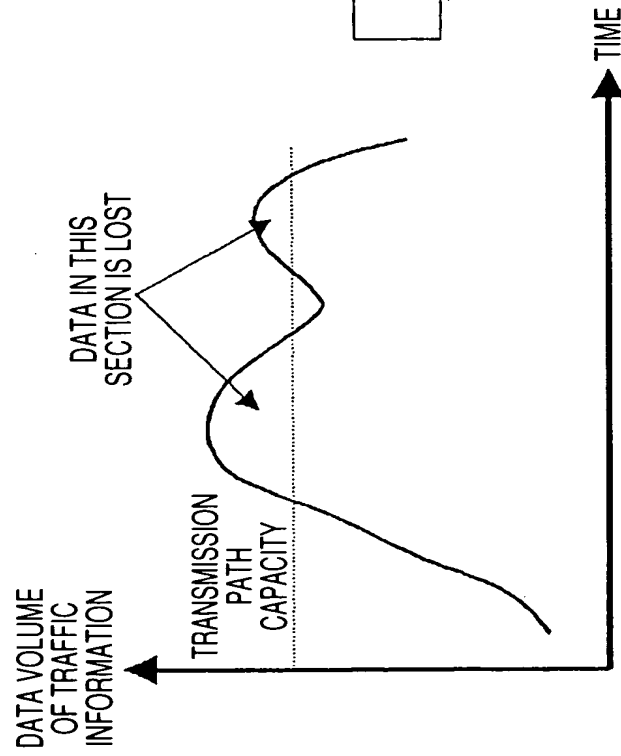


FIG. 43(b)

IDEAL SYSTEM

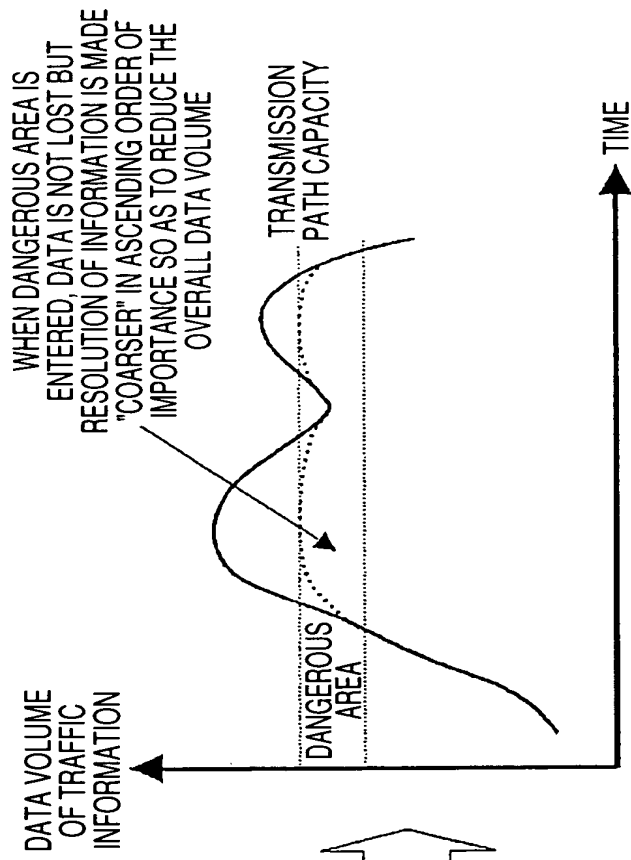


FIG. 44(a)

WHEN TRANSMISSION PATH CAPACITY IS LARGE ENOUGH

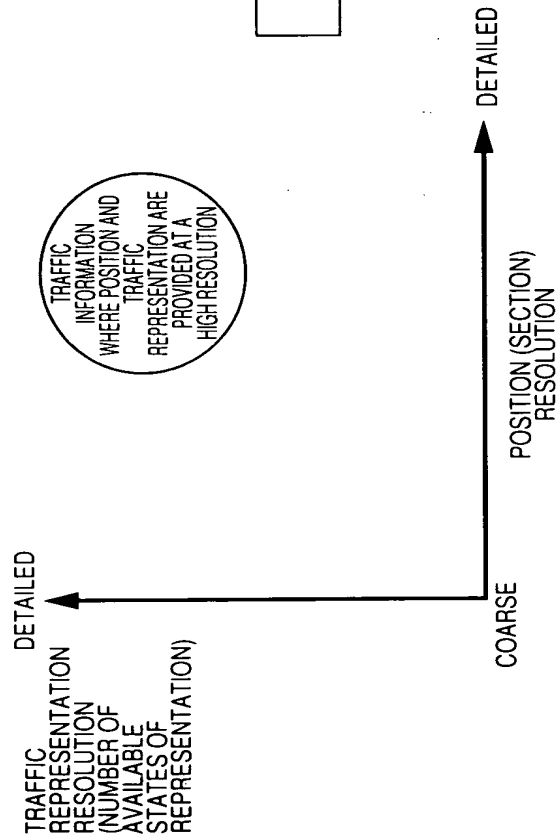


FIG. 44(b)

WHEN INFORMATION VOLUME HAS INCREASED NEAR THE TRANSMISSION PATH CAPACITY

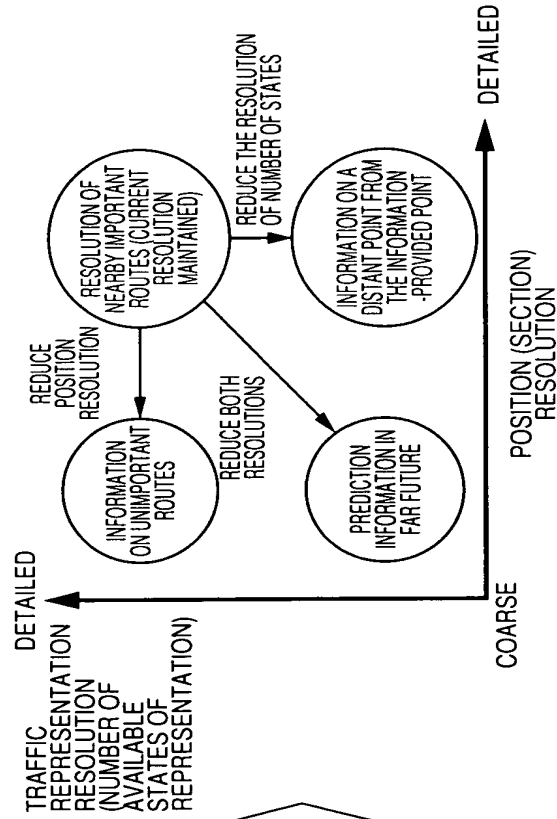


FIG. 45(a)

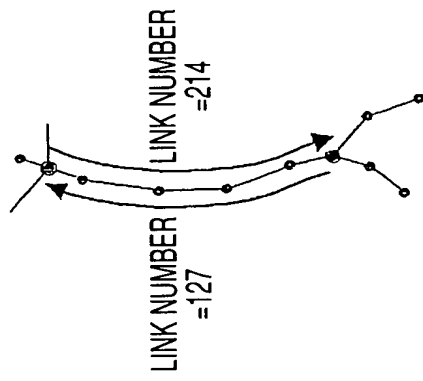


FIG. 45(b)

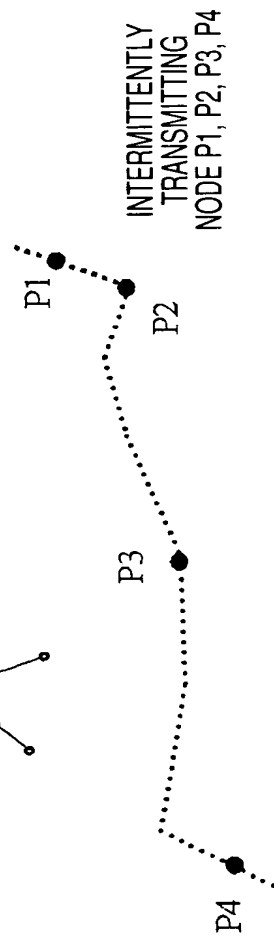


FIG. 45(c)

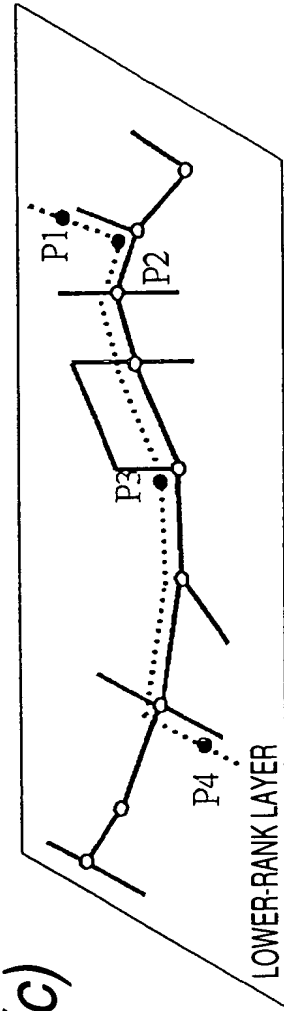
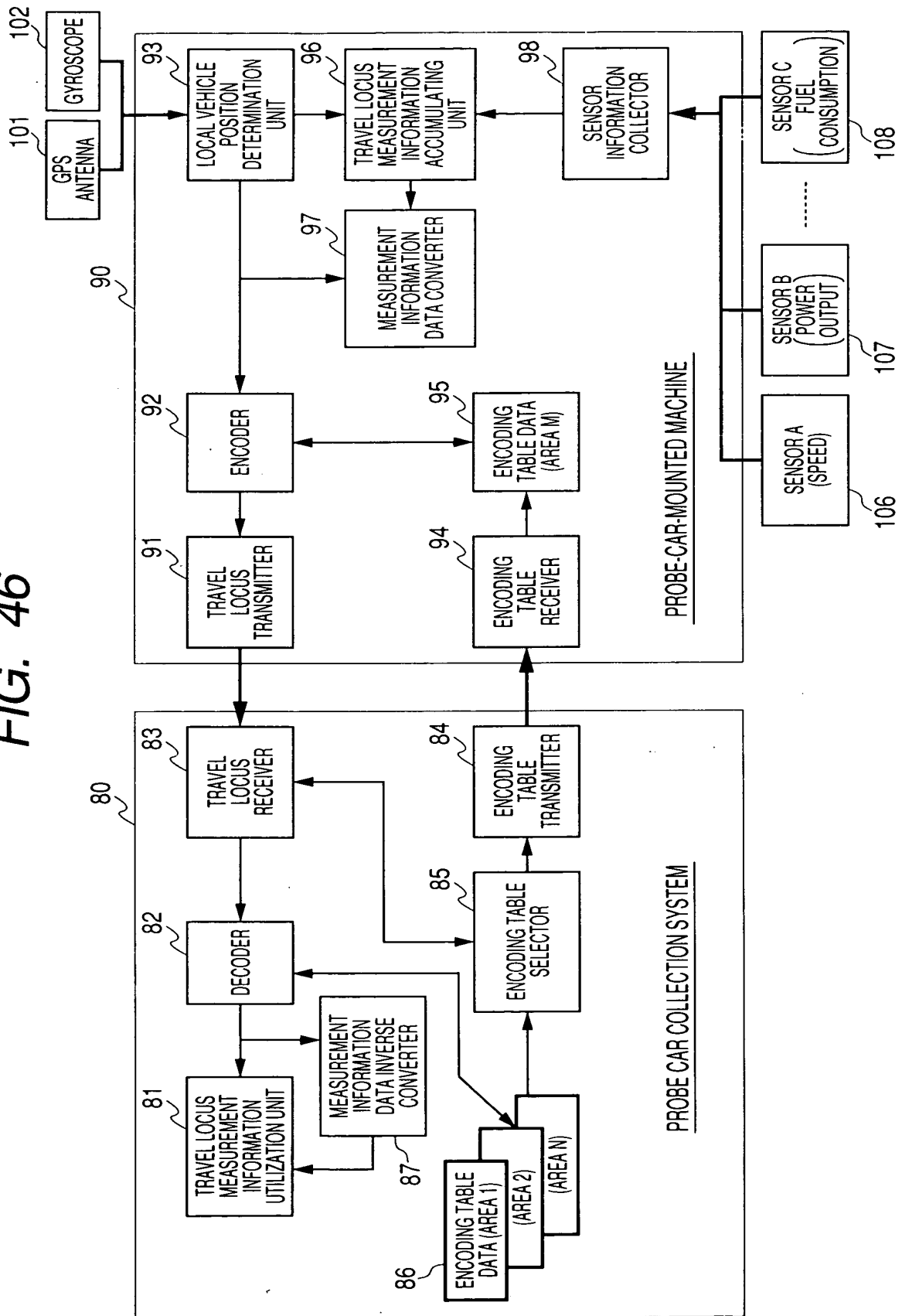


FIG. 46



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